DISTRO

engadget

100

**FEATURING A FEW
OF OUR ALL-TIME FAVORITE
SMARTPHONES, TABLETS,
CAMERAS, CONSOLES,
PCS, ROBOTS AND EVEN
A BLENDER THAT BLENDS**

If you can connect to this.
You can connect to us.

Reach State Farm® 24/7/365
by phone, online or app.

Learn More ▶

⊛ **StateFarm**®

ISSUE 100

DISTRO | 07.26.13 | TABLE OF CONTENTS

On the Cover: Illustration by Luke Lucas for Distro

HAPPY 100TH ISSUE!

EDITOR'S LETTER

When the first issue of Distro appeared in September 2011, tablet magazines were far from a sure thing. Apple's third-generation iPad with its graphics-friendly Retina display was more than six months away from existence; traditional publishers were struggling to make money from their iPad editions; and even Flipboard — despite attracting millions of users (and millions of dollars from investors) — had only recently begun selling ads, and its success as a business was far from assured.

It was into this environment that Engadget launched Distro, a free iPad magazine that, from the start, distinguished itself by its sharp design, bold approach to content and willingness to push the concept of tablet publishing to its limits. The day it appeared in the iTunes App Store, it debuted as the No. 1 free news app, and things have barely slowed down since. Distro went direct from CES in 2012 with a double issue and a daily in 2013. It was a 2012 Webby Official Honoree; 2013 Appy Award Winner for Best Consumer Magazine / Newspaper App; and 2013 Society of Publication

The award-winning cover for issue No. 49, which was cut on a Kikori CNC at Artisan's Asylum in Massachusetts.

Designers Award Winner (Gold Medal Tablet App Cover Design for "Hand-Made Haven," issue No. 49). And, of course, the magazine is now available on every major tablet platform, including Android and Windows 8. And with this issue, Distro turns 100!

In recognition of this milestone, I've asked some of the people behind Distro's success — including Christopher Trout, who has been its executive editor from the start — to share some of their memories, war stories and proudest moments from the past two years.

Christopher Trout, Executive Editor

The night before we wrapped our very first live (we launched with five issues prepared in advance) issue, Steve Jobs died. It was a truly tragic moment for
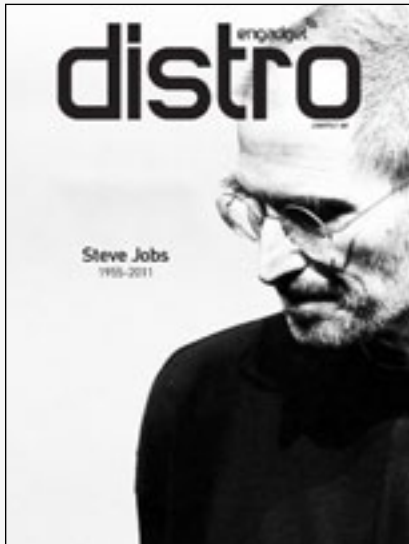
The Steve Jobs tribute issue was assembled in just 24 hours after hearing the news of his passing.

The Distro design team lets off a little steam for the final cover of the CES 2013 dailies.

the tech industry at large and one we couldn't ignore. I'm not sure what the cover for that issue was supposed to be — it may have been a review of the Grid 10 tablet or a breakdown of the iPhone 4S — but it was clear that we'd be doing our readers a disservice if we launched with anything other than Jobs on the cover. It was that night that I realized what an amazingly dedicated and flexible team we had. Our design team pulled together an entirely new spread, cover and TOC and we finished a tribute to a legend in 24 hours. It's those moments where the whole team comes together and works tirelessly that you realize what a great group of people you work with.

Jon Turi, Associate Editor

Our art director was keen on making his maiden CES voyage a tour de force and persuasively pitched the idea of a daily. Four issues in four days; each cover shot on location using a Plexiglas frame. We managed a pretty high profile around the show with our hi-

jinks in search of the best shots. Nearing completion, with one last cover shoot to go, we took the CES-worn and cracked prop out to the parking lot for a smashing finale.

Greg Grabowy, Art Director

The highlight of my experience here has been fabricating covers; creating physical things for a digital magazine. The first time we did something like that, we shipped a cover design to a hackerspace that we'd profiled for that issue. They used a CNC router operated by a Wii controller to etch our coverlines and logo into a piece of wood, and we won an SPD award for it. I've also had the chance to learn 3D printing for a feature on the new MakerBot Replicator and had laser-cut covers created for our CES 2013 daily. Shattering that CES cover was awesome.

A trailer-ridden Las Vegas Convention Center parking lot at the early stages 2013's CES event.

Distro's first issue was produced on a shoestring budget of $0.
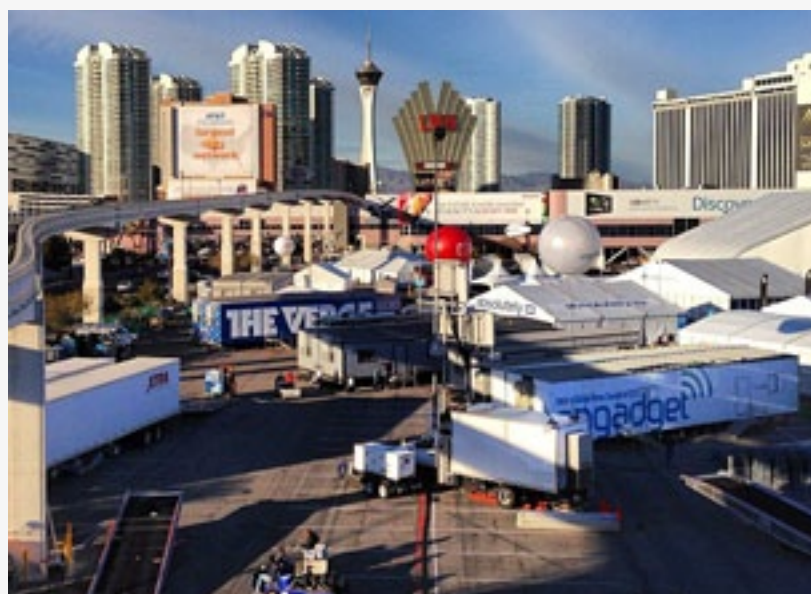
Candy Bigwood, Designer

Dead serious, my fav aspect is by far the people I worked with. More than the content itself. They made it fun and challenging. But if I had to choose the highlight, it'd be launching the very first live issue with success. So much effort went into creating it, and it was a really proud time. Then minutes later it was time for the next one...

Jeremy Lacroix, AOL Magcore Head of UX And Design

First magazine to ever publish issues from the floor of CES, 2012. Published two live issues from the double-wide trailer without a net. Seven 14-16 hour days in a row. Learning how to do it the hard way with a small scrappy crew after pushing ourselves to the limit working tirelessly over the previous holiday season. Those months from Halloween through mid-January were brutal! The time we broke the platform because of an ampersand! I'll never forget the engineer's remark: "Nobody said you were going to use ampersands!"

Philip Palermo, Copy Editor

Strange as it may seem, my standout Distro moment was the first time I laid eyes on it. It was certainly an "Oh, heck yes" type of experience. After years working in newspapers, the bright, colorful layout and fascinating subject matter of Distro made me feel lucky to be here. With each issue, I'm continually impressed with the work everyone puts in — and I hope that feeling continues for at least 100 more.

I'd like to echo the words of a number of Distro veterans, and thank Tim Stevens for believing that a tablet magazine was worth doing — and making sure it got done, week after week over almost two years. And as someone who has just joined the Distro universe, I can't wait to see where we go with the next hundred issues! Ⓓ

MARC PERTON
EXECUTIVE EDITOR,
ENGADGET

TECH TIMING, 3D FOR DOLLARS AND THE LEMUR INQUISITION

INBOX

ALL GOOD THINGS
ISSUE 99,
JULY 19TH, 2013

"Best of luck Tim! Thanks for all the hard work you've done!"
— **NAMREVEROF**

"Best wishes Tim. You made this site into something great. Hope your next endeavor is even better."
— **JEFREYMATENJE**

"Tim you will be missed. Engadget has become a significant part of my In-ternet experience and I thank you for all your efforts over the years. I always enjoyed your articles."
— **MACLINGMAN**

DEAD! DEAD! DEAD! (IN 2D)
ISSUE 99,
JULY 19TH, 2013

"The problem is 3D is too expensive. Most people

THE WEBTV REVOLUTION THAT DIDN'T HAPPEN
ISSUE 99,
JULY 19TH, 2013

"Like many of Steve Perlman's inventions Web TV was ahead of its time. It would have been great, but I think at the time the people who would've used it were still unsure of what the web was or how it could help them. By the time they were ready for it, home computers had become cheap enough that it wasn't needed."
— **PHILNOLAN3D**

have just spent a lot of money on a non-3D flat-screen and now need to spend more money on a 3D flat-screen? 3D needs to be cheap... and it needs to be on all TVs! Anyway... I'm hoping the Oculus will turn into a huge hit and that will give a huge stereoscopic experience."
— **JEFFMD**

ACER ICONIA W3
ISSUE 99,
JULY 19TH, 2013

"I'll wait for a smaller Surface, thanks. Something to be said for better build quality. If I can get an 8-inch Surface in 16:10 with 1,200p I'd be more than set. Hopefully MS can make it happen."

— PHILIP.WEBER

SAMSUNG GALAXY S4 ZOOM
ISSUE 99,
JULY 19TH, 2013

"A little messy, perhaps, but I like where this is going…"

— JYUDZEVICH

"Can't wait for the Galaxy toaster."

— SICSICPUPPY

DAVID COLE
ISSUE 99,
JULY 19TH, 2013

"And he's showing the lemur what exactly on the screen? Who cares what he likes in mobile OSes. We want to know what's the deal with the lemur?!

WE KNOW TOO MUCH
ISSUE 99,
JULY 19TH, 2013

"Context is key. Say I'm walking through the mall, or cruising through a business district; ads for specials could be a very desirable thing. If I just want to find the quickest route home, then the notifications should be related just to the travel context. I'd be surprised if companies implementing such features don't think of our different contexts."

— Z23

Is the lemur a production crewmember? What types of shows do lemurs like? Does Red make a camera that doesn't require opposable thumbs for the lemur market?"

— HENRYHBK

ENTER

EYES-ON

MISSION RS

Tap for detail

AERODYNAMIC

DESIGN-MINDED

CONNECTED DASH

PHOTOGRAPHS BY WILL LIPMAN

ELECTRIC ROAD ROCKET

We've come across a number of electric motorcycles during the course of our exploits, but none have us as smitten with design lust like Mission Motorcycles' RS. That crafted exterior houses an innovative construction, interactive display and powerful performance capable of speeds of over 150MPH. It's also engineered, designed and assembled in the US.

THE DAMAGE: $58,999

ENTER

EYES-ON

MISSION RS

AERODYNAMIC
Motonium's Tim Prentice crafted the industrial design of the Mission RS to be futuristic, yet timeless with aerodynamics at the forefront to bolster the InfiniteDrive powertrain.

PHOTOGRAPHS BY WILL LIPMAN

ENTER

EYES-ON

MISSION RS

DESIGN-MINDED
Notable motorcycle designer James Parker developed the frame for the Mission RS. Its trellis construction strays from the norm for a stellar combo of weight distribution, center of gravity and mass centralization.

PHOTOGRAPHS BY WILL LIPMAN

ENTER

EYES-ON

MISSION RS

PHOTOGRAPHS BY WILL LIPMAN

CONNECTED DASH

The Mission RS's interactive display offers Bluetooth, range info, navigation, HUD support and an industry-first HD camera for real-time telemetry data all via an included cellular connection. Needless to say, this machine definitely demands the term "smart bike."

State Farm®

Try an upgrade that can actually save you $500.

Switch to State Farm® and save $500* on auto insurance.

Get A Quote ▶

Click on product names to read full stories

NEXUS 7 (2013)

The Nexus 7 was a rather swell device when it was officially launched last year, and now we've had the opportunity to play with the next-gen version, which bumps the swellness factor a notch or two. The tablet, which boasts a 1080-quality display (1,920 x 1,200, to be precise) and Android 4.3 Jelly Bean, was shown off after the Breakfast with Sundar event.

While most of the tablet's specs are improved over last year's model, one of the most visible differences is its HD display. Our experience looking at the new Nexus 7 was very similar to the bliss that we had after seeing the Nexus 10's panel for the first time, only this one is of course smaller. Certainly, a pixel density of 323 ppi is pretty impressive, and we were quite impressed by the amount of detail we were able to see in the sample videos and photos running on the demo device we handled.

We loved how the Nexus 7 felt in our hands, especially since the original version was a good deal thicker. The weight difference is noticeable, too. Under the hood, the Snapdragon S4 Pro chip is also a nice step up from last year's Tegra 3 SoC. Combined with the faster GPU, an additional gigabyte of RAM and Open GL ES 3.0 support, we're left with a far smoother gaming experience with plenty of subtle improvements to the graphics experience in particular. We'll reserve final judgment for our forthcoming review, but we were at least initially satisfied that this new iteration of the Nexus will perform better than the last.

GOOGLE CHROMECAST

We should've known this was coming after Google and Netflix informed us back at CES that they were working on their AirPlay competitor, the DIAL wireless streaming protocol. Now, with the revelation of the new Chromecast HDMI dongle to leverage DIAL and expand upon it, you'll be able to stream more content more easily to your home's biggest screen — all for just 35 bucks. As noted during the announcement, the dongle itself is a mere two inches long, with a bulbous circular end opposite the necessary HDMI port. We're a bit concerned that flared-out end might take up the space of two HDMI ports despite it needing only one to operate. Regardless, it's a solid little thing, constructed of black plastic and

PRICE: $35

AVAILABILITY: NOW AVAILABLE

THE BREAKDOWN: GOOGLE'S HDMI DONGLE WIELDS CHROME OS FOR NETFLIX STREAMING AND MORE.

jammed with the 2.4GHz wireless radio needed to talk with tablets and phones. There's no battery inside, however, which is why the dongle also comes with a micro-USB cable and an outlet adapter.

In practice, the act of throwing video from your phone using the YouTube or Netflix apps is dead simple, and anyone familiar with the mechanics of YouTube's "send to TV" feature will be right at home. In speaking with a Chromecast product manager, he was quick to point out that, while the underlying technology for Chromecast and send to TV isn't exactly the same; the major difference is that Chromecast has been built to scale and integrate with other services. During our brief demo, the system was able to send videos from both a Nexus 4 and an iPhone 5 with only a couple seconds delay before the requested content appeared on screen. Once a video was playing, the handsets could be used for other purposes or put into standby mode with nary a hiccup on the TV.

HTC ONE MINI

PRICE: TBD

AVAILABILITY: SEPTEMBER 2013

THE BREAKDOWN: HTC'S SCALED-DOWN ONE ISN'T EXACTLY A SMALLER REPLICA OF THE ORIGINAL.

The whispers were true: the HTC One mini is a 4.3-inch device with 720p resolution and a nearly identical look to that of its older brother. Under closer scrutiny, however, you'll notice that there are certainly deviations: the BoomSound speakers are a little smaller, the chamfered edges have disappeared and while the back is aluminum, the sides and front edges are polycarbonate. It's significantly lighter than the One, and is even just a tad thinner.

The buttons and ports are all in the same place: there's micro-USB on the bottom and micro-SIM on the left, but the power button doesn't offer an integrated IR blaster. In terms of the display, the mini features a lower-res 720p S-LCD3 panel, but don't let that little spec fool you; we were actually surprised at how much the screen popped out at us. The mini will come with Android 4.2.2 out of the box, running Sense 5.0. Nota-

bly, it features the same excellent 4-megapixel UltraPixel camera in the back with BSI, f/2.0, 1/3-inch sensor, no optical image stabilization, but several different levels of flash intensity; the front is only 1.6 megapixels, but utilizes BSI as well.

Under the hood, a 1.4GHz dual-core Snapdragon 400 is running the show with 1GB of RAM and the battery is naturally a bit smaller at 1,800mAh — there's also no NFC in this smaller model. As you might expect, the processor won't be able to handle the more power-hungry tasks as well as the One can, but we were more than satisfied by the response time and the performance of most basic tasks. The only area in which we're concerned is the Zoe and other Sense camera features that performed so well on the One primarily because of the more powerful chipset, but we didn't get enough time to play with it in realistic conditions.

Click on product names to read full stories

DROID MAXX AND DROID ULTRA

Like clockwork, Motorola and Verizon have refreshed their joint Droid lineup, and we got to check out all three devices. The two more premium handsets, the Droid Ultra and Droid Maxx,

PRICE: $199 AND $299 (ON-CONTRACT)

AVAILABILITY: AUGUST 20TH

THE BREAKDOWN: THE HEIRS TO THE DROID THRONE ARE STILL WRAPPED IN KEVLAR WITH ONE TOUTING 48-HOUR ENDURANCE.
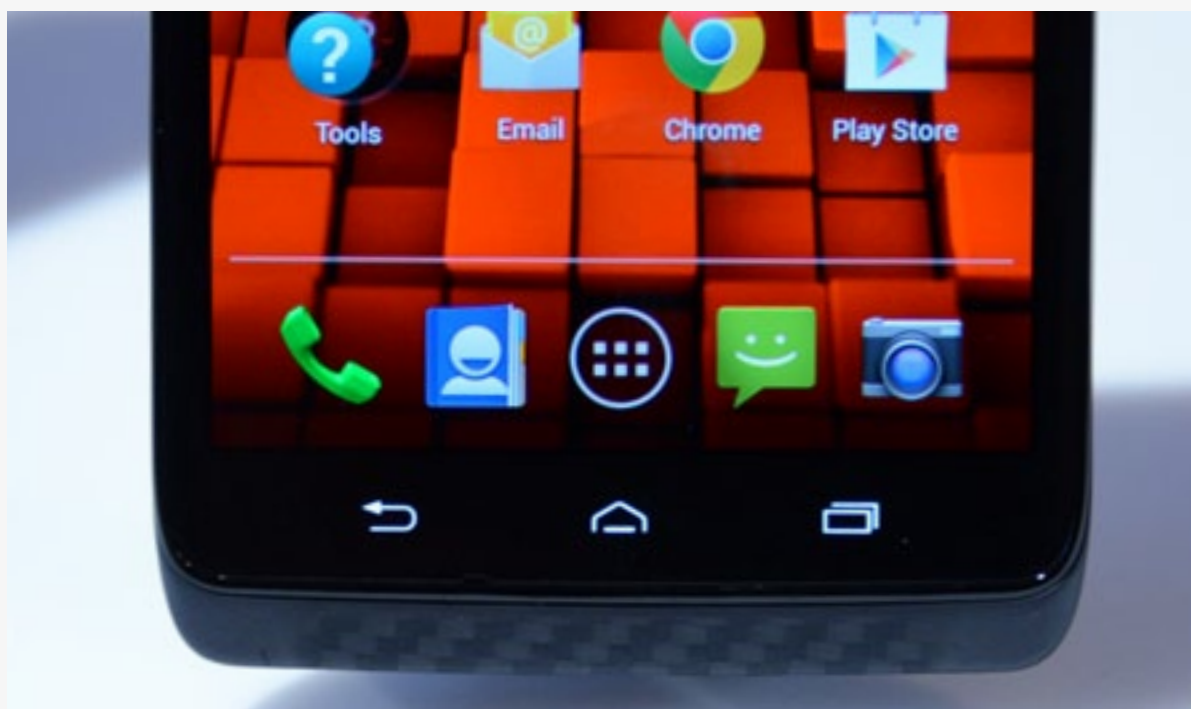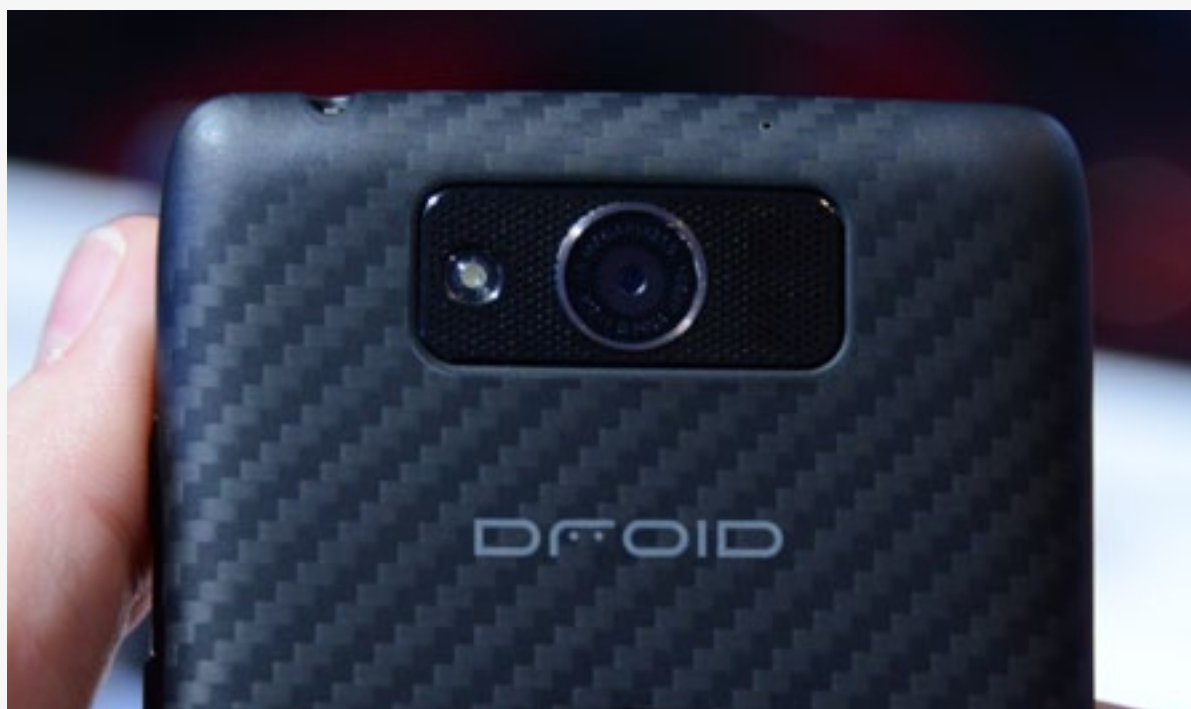
are the most promising of the bunch for advanced users, replacing last year's Droid RAZR HD and RAZR Maxx HD and offering the requisite 4G LTE connectivity. Both of those smartphones were at the top of their game in 2012, and that trend appears to continue here — the Ultra and Maxx are very similar, with the latter boosting the battery capacity, enabling power users to make it through a full day. Like its predecessors, the Ultra and Droid Maxx sport Kevlar bodies, both of which look sleek and feel sturdy. The Ultra we saw has a glossy red finish, which Motorola helpfully suggested is "a lot like a sports car." The Maxx, on the other hand, has a soft-touch black finish. Both phones feature a 10-megapixel camera with a f/2.4 lens; we'll have to wait for our review units to test the shooter's mettle.

What the Ultra's design does have going for it, though, is an extra-thin profile. At 7.18mm, it's already being touted as the "thinnest 4G LTE smartphone available." At 4.94 ounces, it feels very light, and though it sports the Droid family's usual boxy form factor, the edges are gently curved to make for a nice fit in the hand. It packs a 5-inch,

it will last about 48 hours with "normal usage," though we imagine crazy techies like us would see a few hours less.

All three new phones pack 2GB of RAM, with 16GB of internal storage for the Ultra and 32 gigs for the Maxx. When we poked around on the Ultra and Maxx, the phones' dual-core processors seemed speedy. It's worth expounding on that processor, since "dual-core" isn't the whole story: both phones feature Motorola's new X8 arrangement, which includes two dual-core, 1.7GHz Qualcomm 8960 Pro CPUs plus a quad-core Adreno 320 GPU and two additional contextual cores. Of course, Motorola and Verizon also touted the devices' new software features. The Droid Zap feature lets you share photos between Droid devices by uploading photos to the cloud and bringing it down when you use a swiping gesture. Active Display, on the other hand, uses sensors to detect when you hover over the phone and displays shortcuts to notifications.

720p Super AMOLED display, which, while not quite as pixel-dense as the Mini's 4.3-inch TFT panel, offers crisp images, vibrant colors and wider-than-average viewing angles. Apart from the different backings, the Maxx is very much like the Ultra, with that same 5-inch HD display. The biggest exception, of course, is the beefier battery; its 3500mAh pack is larger than the Ultra's 2,130mAh cell, and it's even bigger than the RAZR Maxx's. Motorola said

DROID MINI

Gigantic handsets may be surprisingly popular, but they're hardly appropriate for every smartphone user. Some of us prefer working with a more compact device, and for those customers, Motorola and Verizon have announced the new Droid Mini.

As expected, the phone packs a 4.3-inch display which, like the RAZR M, is nearly edge-to-edge. Though the Droid Mini retains nearly the same diminutive dimensions as the RAZR M, its overall impression is not as slick-looking. That's due to the glossy, unibody design (still Kevlar) Motorola's opted for on the Mini.

The Droid Mini is infused with the same load of features as its bigger brothers, the Ultra and Maxx, and it even shares the same X8 processor arrangement. How does that trickle down into actual performance? The Mini is fast and it's immediately noticeable in the briskness of homescreen navigation to app drawer access and all the way to the smoothness with which it launches apps.

Motorola had a good thing with the proportions and design of the RAZR M and that's something the company has

PRICE: $99 (ON-CONTRACT)
AVAILABILITY: AUGUST 29TH
THE BREAKDOWN: THE DROID RAZR M'S SUCCESSOR BOASTS INCREASED SCREEN RESOLUTION INSIDE A GLOSSY KEVLAR SHELL.

kept consistent in the Mini. Put simply, it just feels great to hold. The Mini's got an updated face — a 720p TFT LCD that may not have the AMOLED pop of its bigger siblings, but it looks good all the same. The combination of a smaller 4.3-inch screen size and 1,280 x 720 make for great clarity. Icons and images appear crisp and colors overall seem vibrant enough to satisfy the eyes of the mid-range customers it's being positioned towards.

We were only briefly able to test out a few of the new features Motoro-la's ushered in with this Droid series, among which there are Droid Zap, Active Display, Touchless Controls, Quick Capture and some new gestures. To launch into the camera app, all users need to do is "twist their wrist" — that's how one Verizon rep put it. Imagine the motion of turning a doorknob... now do that with the Mini. That's how you can access the camera. Simple? Intuitive? Not really. You're probably better off just going the tried-and-true route of actually launching the camera application.
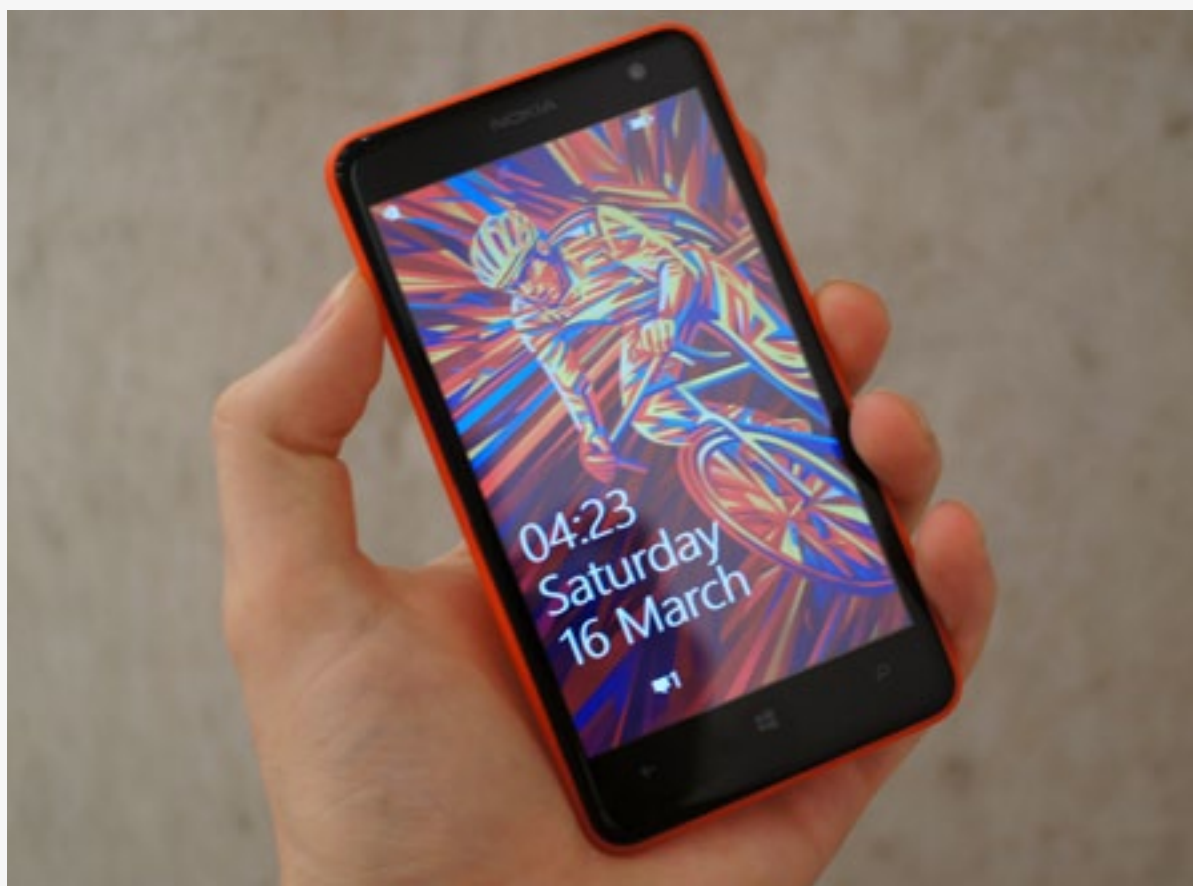
NOKIA LUMIA 625

The rumors were true. Nokia's revealed its biggest phone to date, with a screen measuring in at 4.7 inches. It's the Lumia 625, and it joins a series that has grown a fair bit since the Lumia 620 launched earlier this year. Compared to that earlier phone, the 625 keeps the same resolution (a slightly pixelated 800 x 480), but bumps the processing power up to a

PRICE: £200 (220 EUROS)
AVAILABILITY: SEPTEMBER 2013
THE BREAKDOWN: NOKIA'S LARGEST LUMIA THUS FAR PACKS A LACKLUSTER 4.7-INCH DISPLAY, BUT WIELDS BRITISH-FRIENDLY LTE.

dual-core Snapdragon S4. Despite that hulking LCD screen, however, it's still thinner than the Lumia 920 at 9.15mm (0.36 inches). What's more — and this is rare for an entry-level Lumia — it also has LTE.

If there's anything to remind us that this is no flagship device, it's the camera. Get ready to be a little underwhelmed by a 5-megapixel camera module, although you'll still get the likes of the animated gif-making Cinemagraph and the same Smart Camera app seen on the Lumia 925. Meanwhile, customization options include orange, green, yellow, white and black cases, although there's no turquoise shade like we saw on the Lumia 620.

If you thought the notion of Nokia's biggest-screened phone would result in an unwieldy tablet-bordering size, don't worry. The thinner profile makes it as easy to handle as the Lumia 925, while the matte plastic finish means fingers can keep a grip on it. Those brighter color options look great in real life, reflecting lots of light. The screen is pretty disappointing though, with off-angle views suffering substantially. ◊

Distilling Distro's 100 Issues of Data

ACHIEVEMENT UNLOCKED. With 100 issues behind us, we've decided to take a step back and see how some of the accumulated data stacks up under statistical scrutiny.

100 DISTRO COVERS

Tap for detail

NORMAL

AVERAGED
COLOR

OVERLAY

Q&A ANSWERS

What technological advancement do you most admire?

INTERNET
19%

WIRELESS / WIFI
4%

MICROPROCESSOR
8%

HONORABLE
MENTION

FLOWBEE

Which company does the most to push the industry?

APPLE
37%

GOOGLE
13%

TIE

ARM

SAMSUNG

MICROSOFT
3%

HONORABLE
MENTION

SWEDISH
PIRATE PARTY

What gadget do you depend on most?

SMARTPHONE
59%

LAPTOP
17%

TABLET
6%

HONORABLE
MENTION

SHARPIE
ULTRA FINE
POINT PEN

Distilling Distro's 100 Issues of Data

ACHIEVEMENT UNLOCKED. With 100 issues behind us, we've decided to take a step back and see how some of the accumulated data stacks up under statistical scrutiny.

100 DISTRO COVERS

Tap for detail

NORMAL

AVERAGED COLOR

OVERLAY

Q&A ANSWERS

What technological advancement do you most admire?

INTERNET
19%

WIRELESS / WIFI
4%

MICROPROCESSOR
8%

HONORABLE MENTION
FLOWBEE

Which company does the most to push the industry?

APPLE
37%

GOOGLE
13%

TIE
ARM
SAMSUNG
MICROSOFT
3%

HONORABLE MENTION
SWEDISH PIRATE PARTY

What gadget do you depend on most?

SMARTPHONE
59%

LAPTOP
17%

TABLET
6%

HONORABLE MENTION
SHARPIE ULTRA FINE POINT PEN

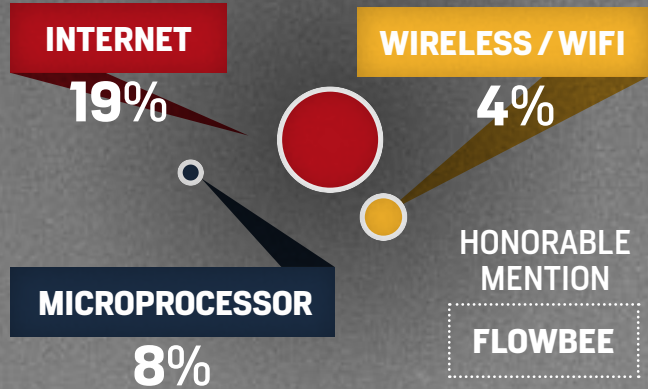# Distilling Distro's 100 Issues of Data

ACHIEVEMENT UNLOCKED. With 100 issues behind us, we've decided to take a step back and see how some of the accumulated data stacks up under statistical scrutiny.
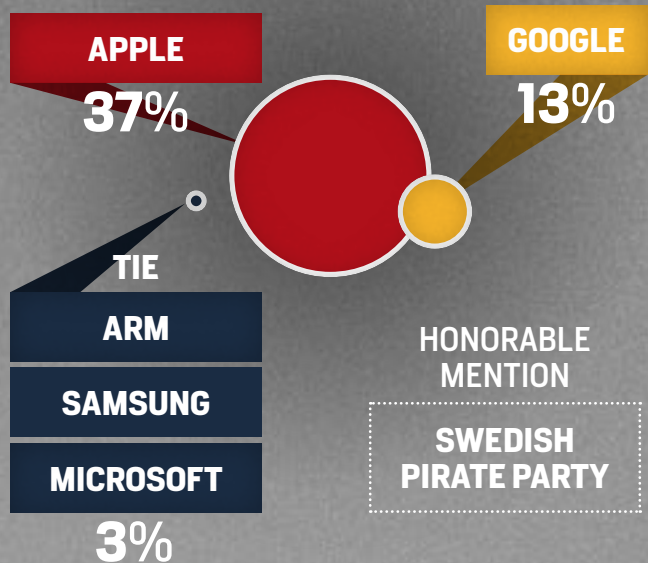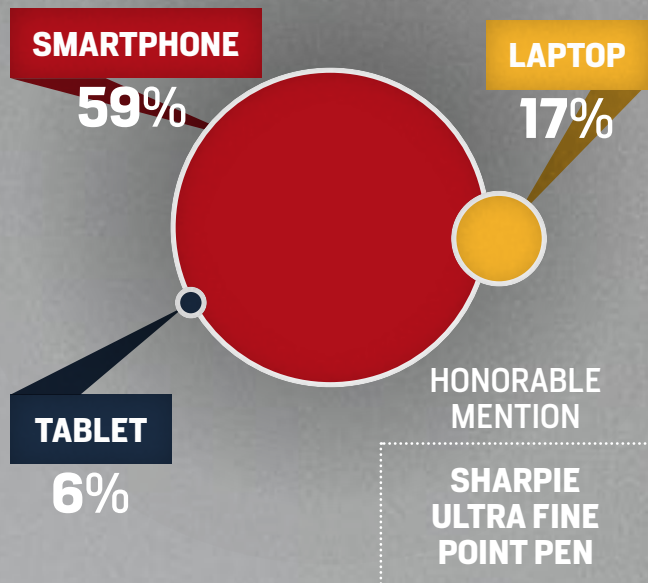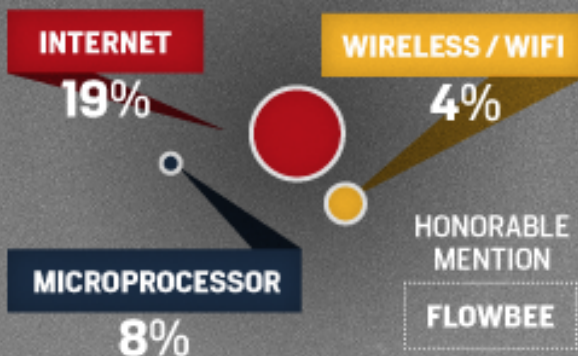
100 DISTRO COVERS

Tap for detail

NORMAL

AVERAGED COLOR

OVERLAY

Q&A ANSWERS

What technological advancement do you most admire?

INTERNET
19%

WIRELESS / WIFI
4%

MICROPROCESSOR
8%

HONORABLE MENTION

FLOWBEE

Which company does the most to push the industry?

APPLE
37%

GOOGLE
13%

TIE

ARM

SAMSUNG

MICROSOFT
3%

HONORABLE MENTION

SWEDISH PIRATE PARTY

What gadget do you depend on most?

SMARTPHONE
59%

LAPTOP
17%

TABLET
6%

HONORABLE MENTION

SHARPIE ULTRA FINE POINT PEN

TIME MACHINE TIMELINE

100BC
800AD
1800
1810
1820
1830
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990

0 1 2 3 4 5 6 7 8 9 10

200-800 AD ASTROLABE
ISSUE 50

1838 STEREOSCOPE
ISSUE 69

1947 CURTA CALCULATOR
ISSUE 47

1949 THE AEROCAR
ISSUE 81

1963 THE MOUSE
ISSUE 55

1982 VECTREX
ISSUE 75

1956 AMPEX VRX-1000
ISSUE 74

Q&A ANSWERS (CONT)

Which fault are you most intolerant of in a gadget?

BATTERY LIFE
13%

SLOW SPEED / FREEZE / CRASH
10%

BAD DESIGN / BUILD QUALITY
5%

HONORABLE MENTION
USER-SURLINESS

When are you least likely to reply to an email?

SLEEPING
15%

TIE

EARLY AM / PRE-COFFEE

VACATION
5%

SHOWERING
3%

HONORABLE MENTION
WHEN IT CONTAINS A 21-PART QUESTIONNAIRE

Click on headlines to read full stories

Baer's Odyssey: Meet the Serial Inventor Who Built the World's First Game Console

By Declan Burrowes
Ars Technica

Ralph H. Baer may not be as well-known as some figures in video games, but most over a certain age will be familiar with at least some of his inventions, and it's virtually impossible not to be familiar with his legacy. Profiled for *Ars Technica* by Declan Burrowes, Baer is best known as the creator of the first home video game console, the Magnavox Odyssey, not to mention the *Simon* electronic game that became a hit in the '80s. Now 91, Baer reflects on his career and his legacy, as well as his decades-long dispute with Atari's Nolan Bushnell. On that, Baer says, "Life's too short to hold grudges."

Why Everybody Loves Tesla
By Ashlee Vance
Bloomberg Businessweek
Ashlee Vance takes an in-depth look at the state of Tesla and its founder and CEO, Elon Musk, and his grand ambitions for the company. As Vance explains, that overriding goal is to "simultaneously become the next Ford Motor and ExxonMobil — to be a profitable, mass-scale manufacturer and fuel-distribution network."

The Lost Marshall McLuhan Tapes
By Peter C. Newman
Maclean's
A newly unearthed conversation between Marshall McLuhan and Peter C. Newman, then editor of *Maclean's* magazine, sees McLuhan touch on an expectedly wide range of subjects including politics, cities and surveillance. On that last point, he somewhat presciently said, "espionage at the speed of light will become the biggest business in the world."

Lebanon's Forgotten Space Race: In 1961, Manoug Manougian Aimed the Middle East at the Stars
By Rashed Aqrabawi
Vice Motherboard
Vice's Rashed Aqrabawi talks to rocket scientist and current University of South Florida professor Manoug Manougian about a largely forgotten part of the space race in the 1960s: the Lebanese Rocket Society, which launched the first rocket from the Middle East, and was also the subject of a recent documentary.

The Secret Service Agent Who Collared Cybercrooks by Selling Them Fake IDs
by Kevin Poulsen, *Wired*
In this piece for *Wired*, Kevin Poulsen details the Secret Service effort known as Operation Open Market (only part of which has been made public), including how one agent found himself in the business of producing fake IDs to catch identity thieves and credit card fraud artists, while taking on someone else's identity himself to make it happen.

APPLE'S DASH FOR THE DASHBOARD

BY BRAD HILL

Cars are dangerous, all the more when drivers reach for controls positioned at arm's length. Road risk is increased by the fact that many drivers seek distraction or productivity while rolling along. Multitasking while behind the wheel can be more perilous than driving drunk.

The car also represents third-party business opportunities. It is an underserved mobile environment. Many apps that work beautifully at home or in a coffee shop, such as music playback or messaging, are halting or awkward in the rolling living room of a car.

The race is on for control of the car's infotainment systems. Apple's recently granted patent for a touchscreen dash is Cupertino's aim toward owning the dashboard operating system and interface, in ways that hook into the company's device and media businesses. But thorny competition comes not only from other tech companies, but also from the car companies. And whatever victories Apple enjoys in the dashboard could ultimately be neutered by longer-term automotive tech inventions.

The patent grant culminates a long application process and merges several components. Invention credit goes to Timothy R. Pryor, a Canadian inventor, some of whose patents Apple has purchased over the years. Pryor has been working on digital dashboard designs for more than 20 years. This patent's central premise: "This invention seeks

> Many apps that work beautifully at home or in a coffee shop … are halting or awkward in the rolling living room of a car.

to dramatically increase the utility of car informational displays and controls, while at the same time enhancing safety by improving sensory data presentation and ease of interaction with vehicle controls and data sources."

The improved sensory presentation involves "programmable tactile display," described as a mashup of traditional knob control and modern touch control. Touchscreens would incorporate tactile features (bumps, indentations, ridges), which would presumably allow eyes-on-the-road screen operation, and operational feedback you can feel. (I find the micro-vibrational feedback on the LG Nexus 4 to be quite useful, and it feels odd to use phones that don't do that.)

Presumably, Siri voice activation would be part of any iOS-based dashboard system. There are two obvious problems with that scenario. First, Siri isn't good enough yet for mission-critical work. (Neither is Android's voice-recognition companion.) Second, car cockpits are noisy, which would confuse built-in Siri even more.

Apple is picking a good battle in the dashboard. Existing digital systems on average get a low rating from many people for many models. My wife has Sync in her 2010 Ford Escape, and the first thing she did was connect her phone via Bluetooth. Her job at that time involved hours on the road, calling ahead to clients from a large contact list. "Call Bob!" she would yell out to her dashboard. "Calling Deb," the car would purr back without requesting confirmation. Deb would answer the phone while my wife swerved down the road screaming at the car to hang up. The Escape had a stubborn reluctance to end a call. My wife had to — this is true — pull over and turn off the car to hang up. Ford's solution? The dealer told her to buy a new phone.

Ecosystem companies like Apple love to solve single-point problems by locking users into walled environments whose components work beautifully together. Apple is masterful at building those networks and creating loyalty in them. The Apple discipleship would swoon over a car with a ground-up iOS dashboard.

But is there a need for a unifying

...Is there a need for a unifying OS in the car at all?

OS in the car at all? Maybe. Today, the digital dashboard is a fragmented, balkanized battleground, just as the web and mobile handset industries are. You can connect some amount of app function to your car's output systems in most roadworthy cars. I have an anti-tech, 2001 sports car. I get in, plug an adapter into my phone's headphone jack and stream playlists through the Bose sound system. (I guess it's not completely anti-tech. The car also has cruise control. But no digital screens to distract from its sweet ride.)

Whether via wireless or cables, and given a good data connection, you can enjoy music apps and GPS just by bringing your phone or tablet into the car. But climate control, in-dash radio and GPS adjustments on the fly are all difficult. Bringing some controls onto the steering wheel is an analog solution.

Business wars are raging over how to control functions that are inherently digital — in particular, music playback. Three touchstones of this evolution are AM/FM radio, satellite radio (Sirius XM owning that space) and newer streaming services. Things get slivered quickly around streaming solutions. Pandora is cutting deals with dozens of car companies, leveraging its popularity as the most-used (by a wide margin) "internet radio" brand. Apple's announcement of iTunes Radio briefly referenced upcoming integration deals with a dozen car models. Aggregators like Livio Connect provide dashboard presence for internet-streaming terrestrial stations, and are also seeking licensing deals with carmakers. And the car companies themselves are creating proprietary digital dashboards powered by a combination of plug-in and native operation.

Apple's brand clout and user base could be attractive to car companies, regardless of whether the product is particularly innovative. (Can't publish an Apple article without mentioning innovation at least once.) If that's true, where is Google in the dashboard land rush?

Google could be executing an end run around the digitized car problem in two ways. First: Glass. Don't roll your eyes. Oh, go ahead, roll your eyes, but if the essential problem of digital controls in a car is their distance from the driver, miniaturizing those controls and putting them close to the driver's eyeball is good in theory. Voice control through a mic. Audio response through an earbud. Translucent visuals. Android brains in the car's climate, navigation and audio systems.

Or, looking at a more distant horizon, Google's stake in autonomous cars could obviate the dashboard to a large extent. If the car is doing the driving, the human occupant can enjoy his or her mobile apps the way God intended us to use smartphones: eyes on the screen, absorbed in the digital realm, pecking on glass keyboards and sending typo-infested messages to ephemeral friends. ⬡

PLAYED OUT

BY ROSS RUBIN

AT THE LAUNCH of the BlackBerry Z10 and Q10, the first hardware devices to run on the long-awaited BlackBerry 10 operating system, there seemed to be a silver lining for the renamed company's struggling PlayBook tablet. Confirming speculation, CEO Thorsten Heins promised a cheering crowd that the PlayBook would receive an update to a new OS. This would open the door to signature features, a more polished user interface and a vastly expanded app library.

But something was amiss. The company had also announced that, to simplify app development, BlackBerry 10 would support two screen resolutions: the Z10's 1,280 x 768 and the Q10's 720 x 720. In contrast, the PlayBook resolution is 1,024 x 600. Late last month, the other shoe dropped as BlackBerry confirmed that the PlayBook would not receive the promised update, leaving it with an abandoned OS and marking the effective exit of BlackBerry from the tablet market.

The PlayBook served as a symbolic bridge between the old RIM, which often advocated replacing laptops with phones, and the new BlackBerry. The tablet's market entry was marked by the hubris of a company that was still in denial over Apple's tablet momentum. It was priced at parity with the iPad, but with a smaller display and far fewer apps. Much was made of the PlayBook's ability to run Flash and AIR applications, something it may have handled better than any other

tablet on the market.

Indeed, despite a perfunctory industrial design, the PlayBook got a few things right. It was zippy from the start and had HDMI-out along with support for display mirroring, RIM also offered would-be QWERTY-phile BlackBerry phone customers a Bluetooth keyboard folio for the PlayBook, but it was in short supply despite its high price.

But the company took a big hit from consumer-focused reviewers who took the company to task for not including native email and calendaring. Then, RIM watched in horror as Amazon introduced its own 7-inch Kindle Fire at $200. The company responded with radical price cuts, but it was too late. Amazon's content ecosystem overpowered the PlayBook's, which tellingly didn't even have a Kindle app. And while Amazon, like RIM, might not have embraced much about

Android, its app store was poised to support many more Android apps than the PlayBook ever did.

To the new BlackBerry, the PlayBook became a slow-selling albatross that couldn't keep up with BlackBerry 10. Heins may be accused of sour grapes for public proclamations that the tablet has no future. But his earlier, less sweeping statements help explain why the tablet business was simply a tough one for BlackBerry in that it lacked the strong integrated content support of a robust digital store. Even on the enterprise side, where BlackBerry had more relative sway, the ultimate arrival of Windows 8 tablets — particularly smaller ones — would have made for a rougher ride.

And so, now, the BlackBerry PlayBook will take its place in orphaned OS limbo alongside the HP TouchPad, which also saw its price dramatically slashed after its launch. Like the TouchPad, the inclusion of an office suite and PDF-reading capability will keep it useful for some time to come; the PlayBook's integrated video player is also adept at supporting multiple formats. Unlike HP, which slid back into the tablet market, BlackBerry needs to focus on its handsets. Should it regain its footing, though, one hopes that the company — which seems to have now found a balance between differentiation and supporting a broad array of apps — would consult its new playbook in giving BlackBerry 10 a larger canvas. **D**

> ## "To the new BlackBerry, the PlayBook became a slow-selling albatross that couldn't keep up with BlackBerry 10."

SOCIAL NETWORKING MAKES US FEEL ALONE

FORUM

THIS IS THE MODEM WORLD

BY JOSHUA FRUHLINGER

I WAS LISTENING TO SOMEONE, somewhere, on something — not really sure where, and it doesn't matter — but someone said that they'd rather be alone than have friends who make them feel alone. It's probably been said by many people in many different ways, but for some reason, that saying has attached itself to me as I engage in my twice-daily social networking while comparing it to what I'm actually doing in my downtime that doesn't qualify as "work."

Social networks make us feel alone. I'm not claiming to be the first to notice this, but now that there's a social network for pictures, for videos, for 140-character updates, for business networking, for food, for our pets...

I've been on Facebook, Twitter, LinkedIn, Instagram and others since their inceptions because I'm a huge nerd, but also for a much more insidious reason that I'll get to in a bit. I was on Friendster resisting Myspace resisting Facebook, and so on — I even worked at the short-lived theglobe.com '90s online community. In the end, I kept up with whatever was the latest and in each case, I carried friends over from network to network, gaining some on the way, losing others on the way back.

Here's the deal: I'm pretty sure I suffer from social anxiety not because I was born with it, but because

If what I'm doing isn't liked or retweeted by every single one of my 'friends,' I feel incomplete.

of all these social networks. I suddenly find myself worrying more than I should about what others are thinking or doing, wanting to be part of the crowd, feeling left out even when I already have something to do. This has plagued me — a pathetic first-world problem for sure — for as long as I can remember: In the '80s, I had to be a member of the best BBS in Orange County. In the '90s, I had to be a moderator of the best music board on Usenet. And in the 2000s, I had to be on whatever social network was in until it was out. Social networks are like nightclubs: They pop onto the scene; they're hard to get into at first — you have to be invited — then they become "the thing." Then people are over them and they move on to the next hot spot.

Social networks are the stuff of nightmares for someone like me. I never say no to friend requests. I wish I was part of every single conversation, and if what I'm doing isn't liked or retweeted by every single one of my "friends," I feel incomplete.

I'm exaggerating a bit. Let me make this clear: I'm not checking my social networks all the time. I have a job, hobbies, a family and other things to do, and at the end of the day, I don't let these things bother me.

That all said, I find that checking in to my social networks is a stressful, anxious thing. I immediately feel as though everyone but me has an incredibly interesting life, that they are out having amazing dinners with amazing people, and most importantly, why wasn't I invited? I don't care if you live in Tokyo: given enough notice, I'd fly out there and join you for shabu-shabu!

No, I wouldn't. But I want to be invited.

In short, social networking, even when I check in while having dinner with the most amazing people on earth, makes me feel alone. It's a bizarre irony that I — and I assume some of you — are faced with.

And yet we keep doing it. We're addicted to the difference potential between what we're doing and what others are up to.

Social networking rewards us for being social with people we're not actually being social with.

But then there are those moments that make us feel oh so good when we get a retweet, a like, a heart, a whatever the thingy is doing to whatever we did. Judge me for being caught up in it all, but the alternative is one of digital reclusiveness.

The other morning, I was listening to Howard Stern interview Alec Baldwin who was talking about how he's had to wean himself from Twitter because he gets himself into trouble too often in 140 characters. Imagine that meeting with his agent:

Agent: "Alec, you gotta stop tweeting. This isn't good for you."

Alec: "But I can't stop. I get so many retweets!"

His solution? He'd only retweet other tweets. In short, he's an addict learning to deal with his problems. Alec Baldwin, the coolest suit-wearing exec on TV, one of the greatest *SNL* hosts ever — even he lets social networks get to him.

I've run into people — more than once — who have sworn off Facebook, Twitter or some other social network. They tell me that they couldn't be happier. But I'd be willing to bet that they still peek in every so often. They're simply saying, smugly, "I didn't want to come anyway."

Social networking rewards us for being social with people we're not actually being social with. It validates us. We already know our real friends like us. But we want likes from those who weren't invited or weren't there to begin with. How messed up is that?

All of this is nothing new — humans, as social creatures, have always sought validation from one another for the things that they do, and that support from those they don't know so well is, in a way, social currency that gives them a sense of fame and power. Clearly not everyone reads this much into social networking, and only the weirdos like me let it get to them, and that's a fair assessment.

But clearly I'm not alone.

Or am I? Add me? D

State Farm®

Facts. Sources. Discounts.

It pays to double check them all.

Do a Discount Double Check® and get discounts up to 40%* on auto insurance.

Get A Quote ▶

*Not available in all states.

REVIEW

CONTENTS

BLACKBERRY Q5

BlackBerry's Q5 aims for the average QWERTY user and emerging markets, but did it set the bar too low?
By Daniel Cooper

This is probably the most important smartphone that BlackBerry will launch in 2013. You see, the Z10 and Q10 were designed for diehards, gadget lovers and those who desired a like-for-like replacement for their aging Bolds. Unfortunately for CEO Thorsten Heins, those people were never the total sum of RIM's (now BlackBerry's) customer base. After all, it was the budget-conscious crowd that embraced BBM to the point where London's 2011 civil unrest was nicknamed the "BlackBerry riots," not to mention the company's popularity in the developing world. Given that the business most

recently posted an $84 million quarterly loss and has only managed to ship 2.7 million BB10 devices, it'll be these customers, then, who the company will need to win back in order to keep its head above water. Unlike its struggling rivals, however, BlackBerry does have one thing its rivals do not: a pedigree in QWERTY keyboards that offer a real alternative to the legion of Android and Windows Phone touchscreens out there.

That's where the Q5 comes in — a portrait QWERTY handset with a 3.1-inch display described as "youthful" and "fun," designed for markets outside of the US, with a variety of color options. But is that enough to tempt back the text addicts of Latin America and the disenfranchised voters of London? It's available for £320 ($490) off-contract in the UK, or free on plans from £21 ($32) per month, but is it enough of a handset to justify its mid-tier price? Can this form factor work in a world where even the cheapest phones can offer 4-inch, pixel-rich displays and broader app support? Is this the handset that BlackBerry needs, or the one it deserves? We could tell you at the top here, but that'd kinda negate the point of the following 2,551 words.

HARDWARE

Despite being part of BlackBerry's "Q" range of handsets, the Q5 bears little resemblance to the Q10 it's meant to sit beside. While the layout and button placement are the same, this really doesn't feel like a BlackBerry handset at all. On

SPECIFICATIONS	BLACKBERRY Q5
DIMENSIONS	120MM X 66MM X 10.8MM (4.72 X 2.59 X 0.42 IN)
WEIGHT	4.2 OZ. (120 GRAMS)
SCREEN SIZE	3.1 INCHES
RESOLUTION	720 X 720 (329 PPI)
SCREEN TYPE	IPS LCD
BATTERY	2,180MAH
INTERNAL STORAGE	8GB
EXTERNAL STORAGE	MICROSD (UP TO 64GB)
REAR CAMERA	5 MP AF F/2.4
FORWARD CAMERA	2 MP
VIDEO CAPTURE	1080P (REAR) 720P (FORWARD)
NFC	YES
RADIOS	GSM (850 / 900 / 1800 / 1900)
	HSPA+ (DC 42 MBPS) 1, 2, 4, 5/6 (850 / 1900 / 1700 / 2100)
	LTE (100 / 50 MBPS) BAND 2, 4, 5, 17 (700 / 850 / 1700 / 1900)
BLUETOOTH	4.0 (LE)
SOC	QUALCOMM SNAPDRAGON S4
CPU	1.2GHZ DUAL-CORE
RAM	2GB
WIFI	802.11B/G/N
WIRELESS CHARGING	NO
OPERATING SYSTEM	BLACKBERRY 10.1

There's quick access to the micro-SIM and microSD on the side.

paper, the phone has nearly identical dimensions to its bigger brother, being only 0.8mm narrower and 0.45mm thicker. But in reality, that difference is palpable. Despite being designed as an upgrade to the mid-range Curve models in the company's product range, the Q5 feels rounded and hefty compared to the Curve 9320.

Diehards will be surprised to see that the company has ditched the removable battery and glass-weave backing, opting instead for a matte plastic chassis. Users will now have to access the micro-SIM and microSD card slots via a flap that runs down the left-hand side, next to the micro-USB port. Up top, you've got a 3.5mm headphone jack nestled next to the display / power button. On the right is the three-way vol-ume / mute rocker, which also doubles as the voice control and camera shutter switches. Meanwhile, the speaker runs along the bottom lip.

The BlackBerry logo sits between the 3.1-inch, 720 x 720 display and the is-land-style keyboard, saved from jostling for space with the speaker, 2-megapixel front-facing camera and LED light at the top of the unit. The square display means that consuming video content is a choice between heavy letterboxing or blowing the picture up and panning-and-scanning (with your finger) like the VHS tapes of yore. Flip the phone over and you'll see a plain back dominated by the "seven flying D's" symbol, set between the camera / LED flash and the removable FCC sticker. Internals-wise, the Q5 is packing 8GB of storage, of

which 4.3GB is usable out of the box, so we'd suggest grabbing a microSD card (up to 64GB) if you're planning to use this as your primary media player.

KEYBOARD

Now we come to the keyboard, without doubt the single most important feature this phone has to offer. Our fingers may have lost their strength thanks to the softening effect of touchscreen devices, but we were excited to spend some time using a physical input device we could feel. Unfortunately, it looks as if this feature was the one where the company was most eager to differentiate the Q5 from its higher-priced sibling.

Back in the day, BlackBerry's top-

Swap out "Bold" for "Q10" and "Curve" for "Q5" and you've got exactly the same setup here.

end Bold line had a sumptuous, confluent keyboard, while the budget range of Curve handsets had an island-style QWERTY layout that was nowhere near as comfortable to use. Swap out "Bold" for "Q10" and "Curve" for "Q5" and you've got exactly the same setup here. The membrane beneath the unit is sufficiently weak that when pushing down the F key, the

The Q5 keeps the same island-style keyboard as the Curve.

G and R keys move along in sympathy. Now, while this problem doesn't create any accidental entries, these little flaws don't fill you with confidence in the hardware. In fact, we can only imagine how bad the materials will deteriorate at the tail end of a two-year deal. Furthermore, as the keys are nearly flush with the chassis, there's a limited amount of travel, but what little there is feels mushy and imprecise despite a mechanical click that lets you know you've landed. We should add, however, that we did put the Q5 in the hands of a BBM-addicted tween, who felt that the phone's keyboard was an improvement over the 9320, but they were the only one in our usual sample group who expressed anything other than annoyance at the keyboard's build.

This may be a little redundant in the modern age, but the tweaked fonts and subtler keying mean that the numerical keypad (which sits inside the keys) has become very easy to miss. We're not sure if we'd like to see a return to the two-tone stylings of the Curve 8520, or the differently colored letters of the Bold 9650, but it does feel as if we're not expected to make any phone calls at all with this device.

DISPLAY

We'll admit, it's been a very long time since we fixed our eyes on a 3.1-inch IPS LCD display for any meaningful period of time. Sadly, it's hard not to feel as if this is a regressive step,

There's even a high-contrast Whiteboard mode to preserve your dry-erase marker scrawls in preparation for next week's TPS report.

even if we can understand that it is the only way to accommodate the keyboard without adopting a slider mechanism. Unfortunately, the trade-off here is that everything's a little too cramped, with a claustrophobic environment that means even if you kick the font size down to 5pt, you'll only be able to see four or five emails per screen — not to mention only being able to see one Facebook post at a time.

On the upside, the Q5 at least makes

The 720 x 720 square screen isn't the best for film viewing.
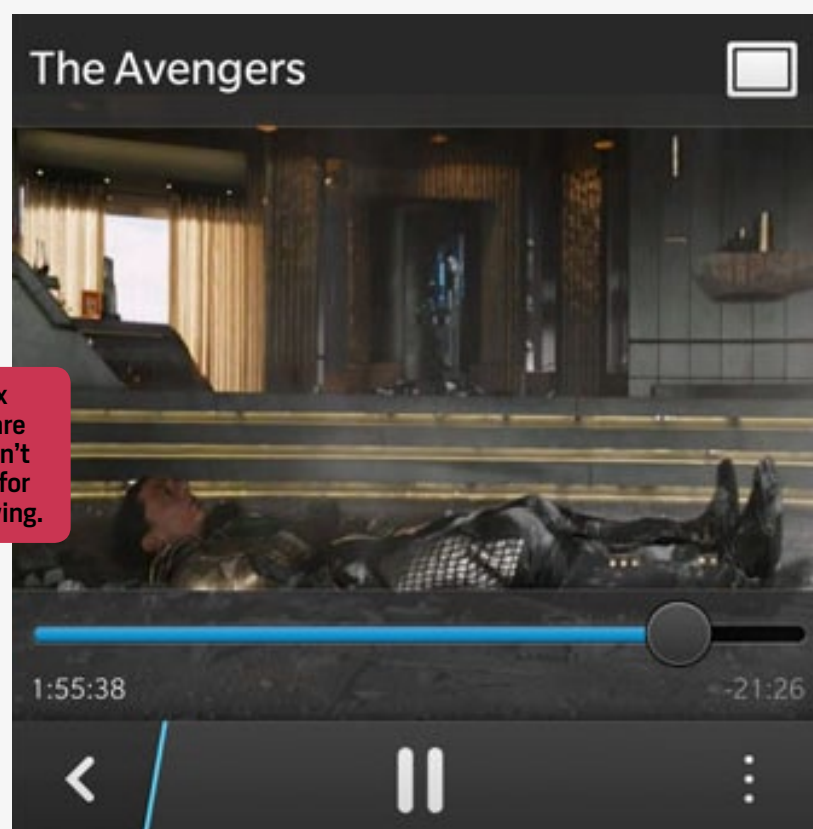
the best of its 720 x 720 screen, with a pixel density of 329 ppi to prove it's not the size, but the quality that counts. One thing we can't fault this phone for is the strength of its backlighting, which made things clearly readable in the harsh noonday sun even at half power. Then there are the strong viewing angles and the better color temperature compared to the Q10, so while we were wary of watching movies on this thing, it turned out to be a rather enjoyable experience nonetheless.

CAMERA

The Q5 comes with a 5-megapixel primary camera with a four-element, f/2.4 lens, plus 1080p video capture and the Scalado-powered Time Shift feature to help you correct errors in group photography. Before we talk specifics, however, it's worth mentioning two quirks in BB10's camera software that may blindside new users. First up, rather than tapping to focus, you've gotta drag around the targeting reticule in order to focus your images before pressing the screen (or the volume down button) to take the snap. Secondly, users can choose one of three aspect ratios for their images — 1:1 is a square picture,

which is equal to the Q5's screen with a relatively narrow focus. The 4:3 option crops off the lower quarter of the image and zooms out a little farther, and 16:9, which heavily letterboxes the image, zooms out a fair way to give you a far greater depth of field.

The camera app is surprisingly powerful compared to Windows Phone and iOS 6, which will make you miss the absent first-party Instagram client that little bit less. There's a choice of creative photo filters, which you can add after the fact, adding sepia tinges — there's even a high-contrast Whiteboard mode to preserve your dry-erase marker scrawls in preparation for next week's TPS report. Styles offer users the ability to add creative borders to their images and there's also a good set of editing tools including cropping, rotation, red-

You'll find a rather capable camera app on the Q5.
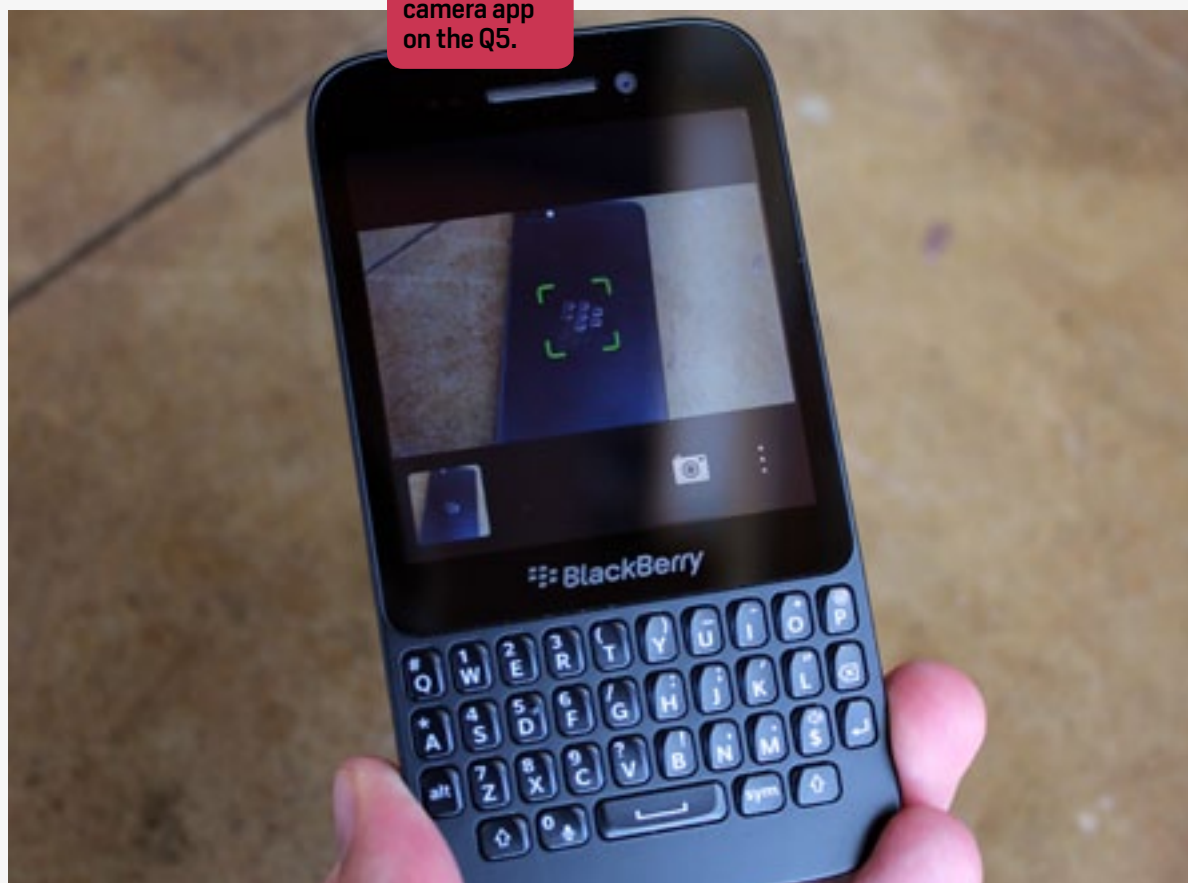
eye reduction and flipping. As the Q5 ships with BB10.1, you have the ability to take HDR images, although it's important to keep the handset perfectly still when taking them, as it was pretty easy to create ghosted images if you're not careful. On the downside, there's no macro or panorama mode, which will disappoint anyone looking to use this as a device that'll capture those special moments no matter the circumstance.

The Q5's 5-megapixel camera is one of the better shooters we've tested over the last few months. On a bright summer's day, images come out with very little noise, along with plenty of detail and strong colors. However, while wandering around on an overcast afternoon, we found the grey skies tended to wash out colors. The HDR mode is similarly so-so, with strong daylight shots coming out really well, though, as we mentioned, be advised how still you have to stand, as even the slightest movement creates ghosting. Meanwhile, shots taken in weaker light are probably destined for your desktop's trash bin.

On the video front, users have a choice of recording clips at 720p or 1080p with an additional stabilization mode. When using this latter mode, we found that every now and again, the video would kick in odd ways as it tried to compensate for a dropped frame. It's very much a fair-weather camera, producing serviceable clips with strong sound, but only when conditions are in its favor. We compared a daylight tromp to a journey

in the tube and found that it struggled to maintain focus and produced grainy, blurred footage when indoors.

SOFTWARE

We won't cover the same ground here as in our BlackBerry 10 review, but we can talk about what this OS is like to use on a daily basis. The handset is running version 10.1, same as was found on the Q10, which provided a number of minor tweaks including downloading email attachments, pin-to-pin messaging in BBM, pasting numbers into the dialer and HDR photography. Once you've gotten used to the gesture-based navigation system (up to return to the home screen, down for settings, left for your emails), getting around the device is pretty easy. In addition, thanks to its bigger bezel, it's actually easier to make the swipes here than on its comparatively cluttered bigger brother.

BlackBerry has also seen fit to add native Twitter, Facebook, Foursquare and LinkedIn apps to the home screen, as well as Box.net, Dropbox and Adobe Reader support for power users. On the downside, there's no native YouTube app; just a shortcut to the browser. The only other big differentiation point between BB10 and other operating systems is the hub — the company's one-stop shop for your email, Twitter and everything else. If we're honest, we didn't enjoy using the hub, primarily because we prefer having our social feeds and our emails not intertwined as

The Q5 is running BB10.1, the same OS as the Q10.
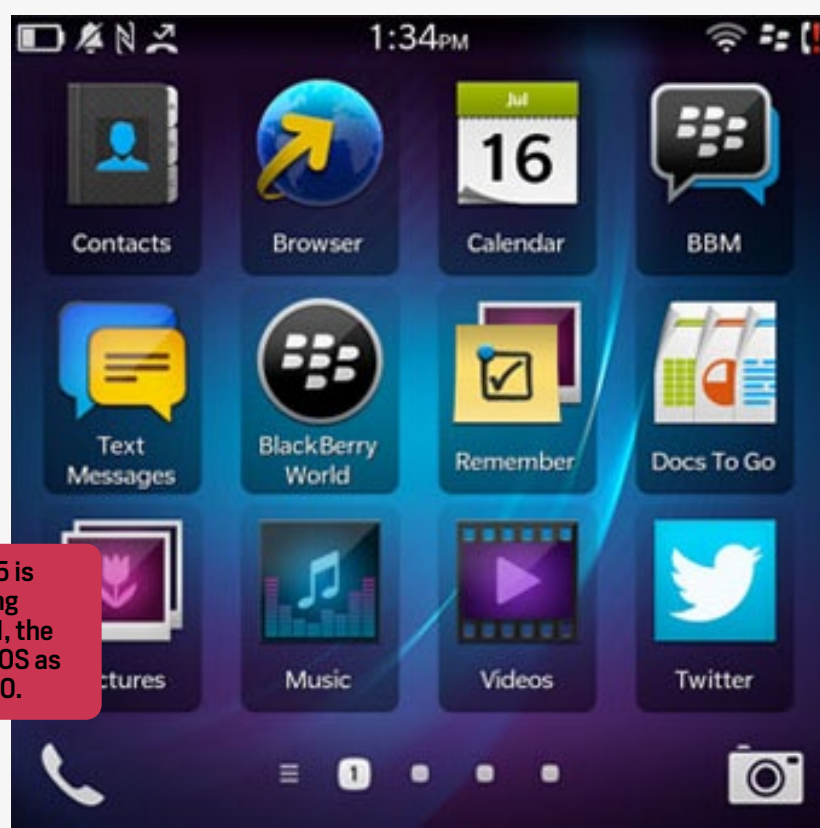
one, but we're sure plenty of business users will disagree with us.

PERFORMANCE AND BATTERY LIFE

The Q5 packs a dual-core 1.2GHz Qualcomm Snapdragon S4 with 2GB of RAM, but as BB10 still lacks the requisite hardware-taxing benchmarking software we use on other platforms, we'll be relying upon web-based browser benchmarks and our general impressions in order to gauge how it'll behave on a day-to-day basis. Unfortunately, the hard numbers don't paint the Q5 in a very flattering light. With a SunSpider JavaScript benchmark of 1,916ms (lower is better), the handset lags well behind the 1,775ms of the Z10 and the Q10's score of 1,465ms. While we shouldn't expect it to be producing flagship-beating specs, the Q5 can't put up much of a fight compared to ultra-budget units like the 1,400ms Lumia

520 or HTC's 1,504ms One VX.

Like its bigger brothers, the Q5 comes with LTE bands 2, 4, 5 and 17 as well as HSPA+ and GSM/GPRS/EDGE, alongside its GPS, accelerometer, magnetometer, gyroscope and proximity sensors. Out here in the sticks, we weren't able to test the handset's LTE performance, but we found speeds were comparable to using other devices on Three UK's HSPA+ network. If you still use your phone to make calls, you'll find it adequate to the task, albeit with more distortion, clicks and compression than we're used to thanks to the coddling clarity of HD Voice.

Given that the Z10 and Q10 both suffered from slow boot-up times, we shouldn't be surprised to see an equally pedestrian situation here. The phone took one minute and 22 seconds to launch from cold and a further 30 seconds to completely shut down. Long story short is that you'll be turning this thing off well in advance of when the pilot asks you to shut off all electronic devices before takeoff, and you'll be the last one to receive calls when you disembark.

In our standard video rundown test, with the display set at 50 percent and WiFi on, the Q5 was able to last an impressive 12 hours and 34 minutes. We're big fans of gadgets with long battery lives, so this gets a big tick from us, even if we must attribute such longevity to the phone's undemanding 720 x 720 display. In the hands of a compulsive Twitter and email user like your humble narrator,

As a whole, the handset feels like a budget device.

we were able to abuse this handset for a full working day before resorting to a re-juice.

THE COMPETITION

We guess there are three groups of people eyeing this as their next purchase. First up, if you're in the market for a BlackBerry 10 device, then you've got the choice of the Z10, the Q10 and… that's it. While there's a distinctly Z5-shaped hole in the company's product lineup, there's no way to tell if we'll see a low-end, full-size touchscreen coming out, or if it's just wishful thinking on our part. Naturally, we've reviewed both devices and the only meaningful difference between the two is if you

prefer a physical keyboard or not.

On the other hand, QWERTY devotees looking for any handset might prefer to consider examples like Motorola's Droid 4 ($400), the Galaxy S Relay 4G ($300), NEC Terrain ($430) or, if money's tight, Nokia's Asha 210 ($80). Finally, if you're just looking for something priced in the sub-$500 range, you could snag an iPhone 4 ($450) or Galaxy S III ($430) for a similar price.

WRAP-UP

The BlackBerry Q5 isn't a bad handset, but it carries the weight of disappointment when you realize that it's not just a stripped-down Q10. Had it been, we'd probably be far more appreciative of the
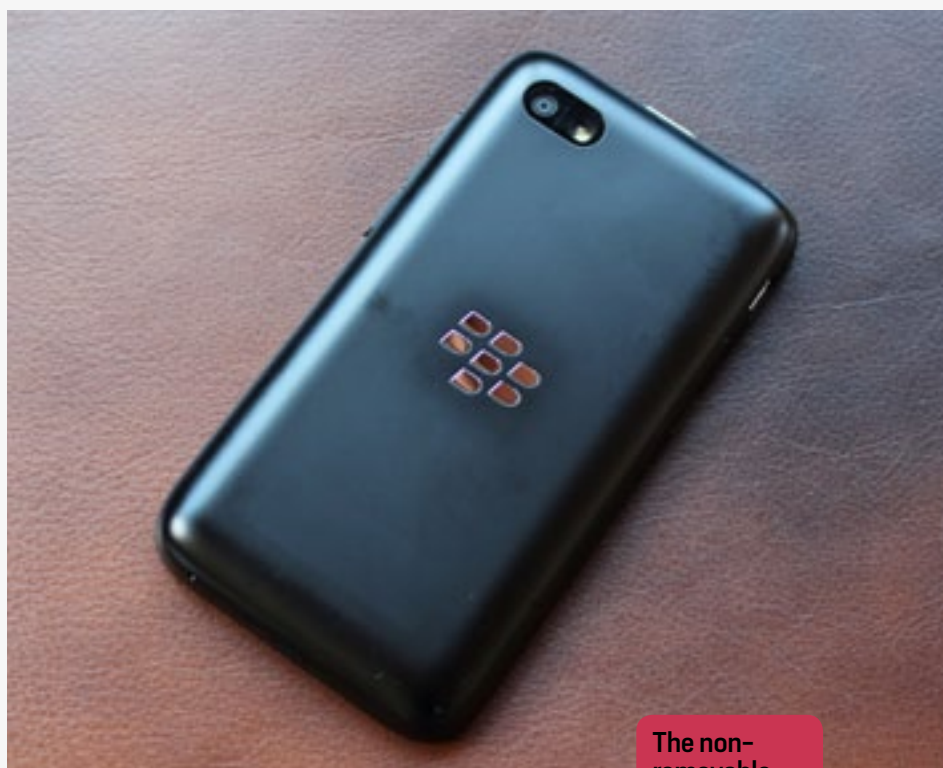
The non-removable battery sits behind a plastic back.

hardware, but as it stands, we have two objections we simply can't get past. First things first, the price. We've labored this point already, but it's worth repeating that unless you specifically want a phone with a physical keyboard, for the same sort of money you can pick up a 2011 / 2012 flagship that'll pack more of a punch. Stick the Q5 beside a Galaxy S III and

you can imagine who will come off the victor nine times out of 10.

Then there's the issue of the keyboard itself, which is terrible. Remember that having a physical keyboard and BlackBerry 10 at a mid-range price is the entire point of the Q5's existence, so why hobble it with a bad one? We have a sneaking belief that some executive, worried that using the company's premium keyboard would eat the Q10's lunch, insisted on resurrecting the island-style keys that plagued the Curve series. It's corporate cynicism of that caliber that means we're struggling to recommend the BlackBerry Q5 as your next smartphone. Ⓓ

Dan is a man of many words, most of which are foisted upon his unsuspecting audience on Twitter.

BOTTOMLINE

BLACKBERRY Q5

£320

PROS
- Long battery life
- Excellent backlight

CONS
- Uncomfortable keyboard
- Small, 3.1-inch display
- Slow performance
- Expensive for what it is

BOTTOMLINE
BlackBerry has resurrected the Curve range with a decent mid-range device. It's just a shame the designers scrimped on the keyboard.

LEAP MOTION CONTROLLER

Can the **Leap Motion controller** satisfy our *Minority Report* dreams with its diminutive form-factor and mostly entertainment-based app selection?
By Michael Gorman

When the Leap Motion controller was revealed to the world, it brought with it the promise of a new and unique computer user experience. And, ever since we first got to see what the Leap Motion controller could do — grant folks the ability to interact with a computer by waving their fingers and fists — we've wanted one of our own to test out. Well, our wish was granted: we've gotten to spend several days with the controller and a suite of apps built to work with it. Does the device really usher in a new age of computing? Is it worth $80 of your hard-earned

cash? Patience, dear reader, all will be revealed in our review.

HARDWARE AND SETUP

The Leap hardware is actually quite unassuming, considering its capabilities. It's just over three inches long, an inch wide and less than a half-inch thick (79 x 30 x 11mm), with a glossy black panel on top, behind which resides the infrared sensors. On the bottom, you'll find a black rubber panel embossed with the Leap Motion logo. The edge, meanwhile, is ringed with a seamless aluminum band, save for a USB 3.0 Micro-B port on the left side (though the device runs at USB 2.0 speeds). There's also a slim LED power / status indicator on the front edge. Alas, as of this writing, the company wasn't able to reveal more specifics about the internals themselves, thanks to pending patent considerations. Along with the controller itself, users get a pair of USB 3.0 cables in the box — a 5-foot and a 2-foot cord.

Keep in mind, the Leap is different from a Kinect sensor bar in more than just its size and appearance. Leap works using infrared optics and cameras instead of depth, and does not cover as large an area as Microsoft's motion controller. Leap does its motion sensing at a fidelity unmatched by any depth camera currently available: it can track all 10 of your fingers simultaneously to within a hundredth of a millimeter with a latency lower than the refresh rate on your monitor. Of course, that tracking ability isn't just about the hardware, and the capabilities of the Leap are only realized by the software built to work with it.

Setting up the Leap is a straightforward affair. Simply plug one end of the USB cord into the laptop, the other into the controller and position it in a location where it can see your hands; in front of a laptop or between a desktop keyboard and screen generally works. Once you're plugged in, you'll see the green LED on the front of the device and the infrared LEDs beneath the top plate come to life. From there, it's a matter of downloading the appropriate Windows or Mac Leap Motion software suite (consumers will be prompted automatically to

The set includes 2- and 5-foot USB cables in the box.

do this upon connecting the device). That download includes both a diagnostic and status program (for reporting bugs and re-calibrating the device when necessary) and the software portal from whence most Leap-friendly apps will come.

SOFTWARE

While executing the hardware correctly is surely of great import, the Leap is a platform that's only as good as the applications built for it. Which is why the company has spent so much time ingratiating itself with developers through an extended beta and created

a purpose-built portal, called Airspace, in which to feature applications built for Leap. As we noted when we first saw Airspace demoed, it's a bifurcated portal composed of the Airspace Store on the web (where you acquire new apps) and the local Airspace Home (a launcher for any and all Leap-compatible apps). When you "buy" an app in the Airspace Store, Home detects that purchase and proceeds to download it automatically.

As of this writing, there are 54 applications built to run on Windows 7 and 8 machines and 58 apps for Macs running OS

This is your home base for all Leap Motion-related apps.

AIRSPACE HOME

Airspace Store · Getting Started · Orientation · Sugar Rush · Google Earth · Roshambo · Block54 · Boom Ball · Flocking · Deco Sketch · Gravilux · Dropchord

Trash

X 10.7 or higher. Nine of those apps are Windows exclusives, and 14 applications are Mac-only, with one app, called Touchless, having separate, but functionally identical versions for each (more on that later). Naturally, with such a large library of software at launch, we were unable to test every app in the Airspace Store. However, we did spend time with quite a few apps for both Windows and OS X.

MAC USER EXPERIENCE

While the Airspace software felt welcoming and polished, things took a turn for the worse when we launched the pre-installed Orientation app, meant to familiarize users with the size of the gesture sandbox provided by the device and to serve as a general introduction to how Leap works. Orientation begins with a screen where a section of 3D space is marked out by a wireframe border and filled with a sort of luminous confetti. That confetti moves as if suspended in water, and it changed from white to glowing yellow and orange hues as we virtually swept our hands through it. Next, we were prompted to draw glowing white marks using our fingers, and, finally, we were shown a futuristic

animated wireframe of our hands that included the individual joints of our fingers and tracked our movements. So far, so good.

Unfortunately, as we moved our hands around, our virtual fingers and thumbs disappeared and reappeared spontaneously; our wrists twitched some from side to side; and even slow, deliberate attempts to rotate our hands from palm up to palm down caused numerous detection failures. Not the most confidence-inspiring way to start off our Leap experience.

However, our faith was restored by several of the apps we tested. It's clear that, right now, the majority of folks building for the Leap are all about creative outlets, particularly gaming and music making. There's *Boom Ball* (think *BrickBreaker* in 3D), which works pretty much as you'd expect: you move around your extended finger, which corre-

The Orientation app gets you started on the interface.

It's not all fun and games here; there are science apps too.
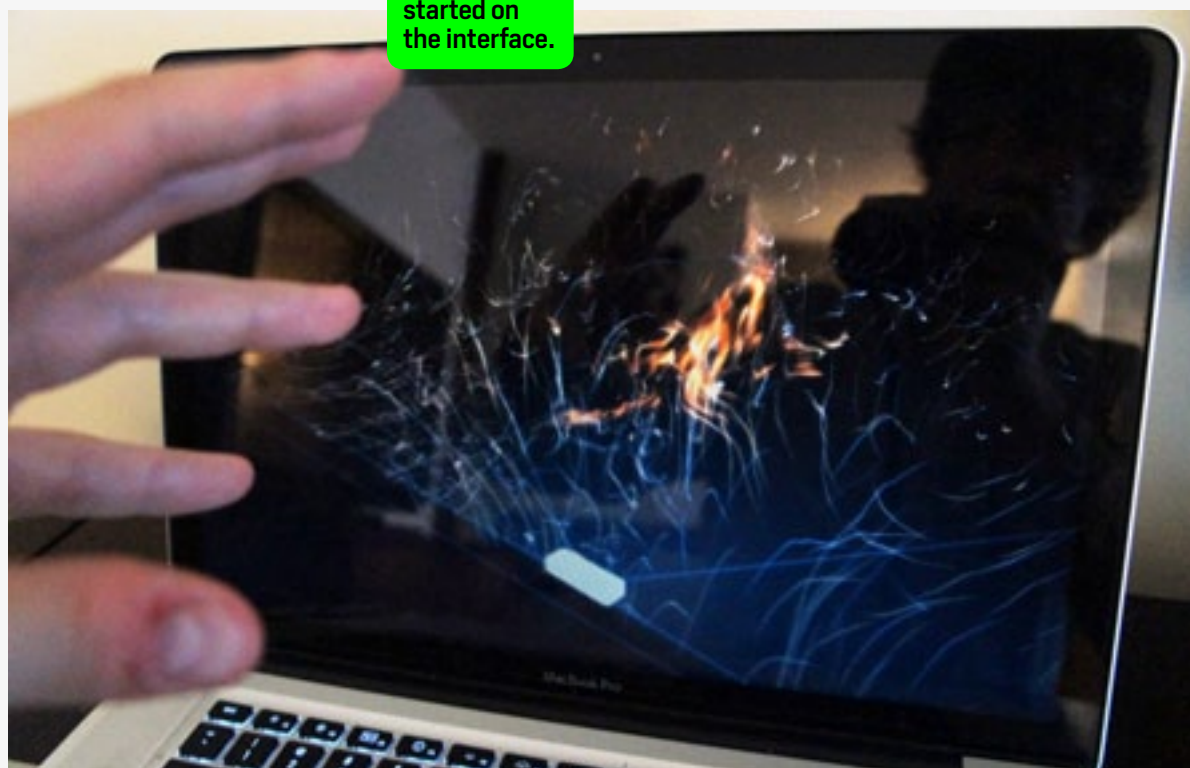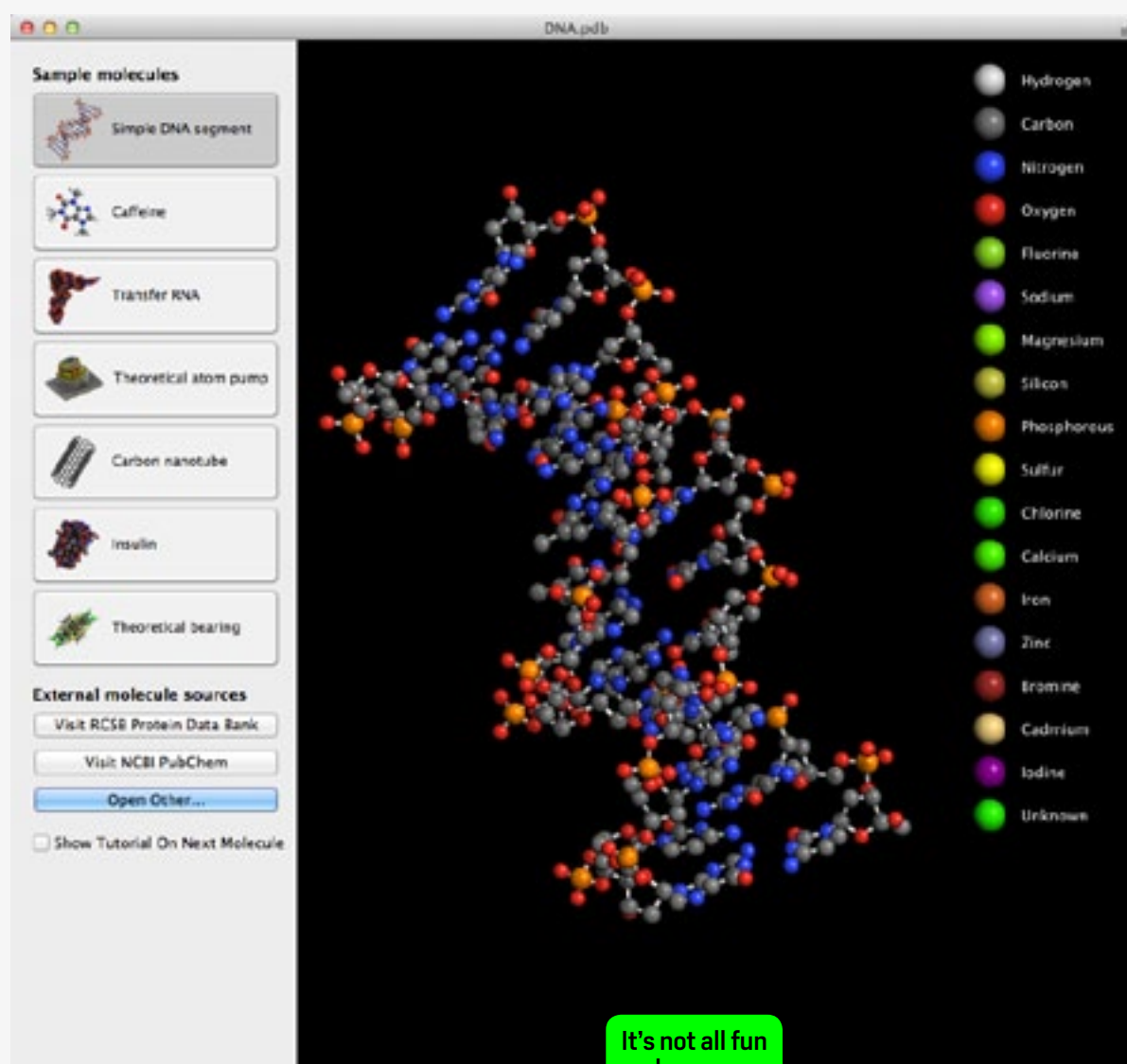
functional viewing area.

Dropchord is a wholly new gaming entity (for this editor, at least). In brief, it's a musical game that provides dazzling (if potentially seizure-inducing) visuals and requires players to use two hands to control dual points that slide along the circumference of a circle. A line connects those two points and players must bring that line in contact with

sponds to a digital paddle, and can control its pitch and yaw for finely tuned ricochet-angle control. *Cut the Rope* (a Mac-exclusive title for now) works as it does everywhere else, only you're swiping through thin air instead of on a screen. In *Balloon Buzz*, your bee avatar tracks to your fingertip and you pop balloons as they appear onscreen. All three of these games largely feature similar mechanics to touchscreen games, and the Leap performed admirably with all of them. The controller tracked our fingers precisely, and input dropped only sporadically, largely due to our own excitement causing our movements to become frenetic, or exiting the Leap's

orbs that appear within the circle to score and advance within the game. The controls here are simple, and since they're limited in scope, we had nary a problem — our failures in the game were due mainly to lack of skill.

Not all our gaming experiences were positive, however. *Digit Duel* is a gunslinger-dueling title with pretty hand-drawn-style graphics, where you draw by forming your hand into the shape of a gun and flicking your finger up to shoot. We struggled mightily getting the game to recognize when we wanted to fire, and aiming was — forgive the pun — a crapshoot. *Vitrun Air*, a *Marble Madness*-style game where you move your hand forward to move and left or
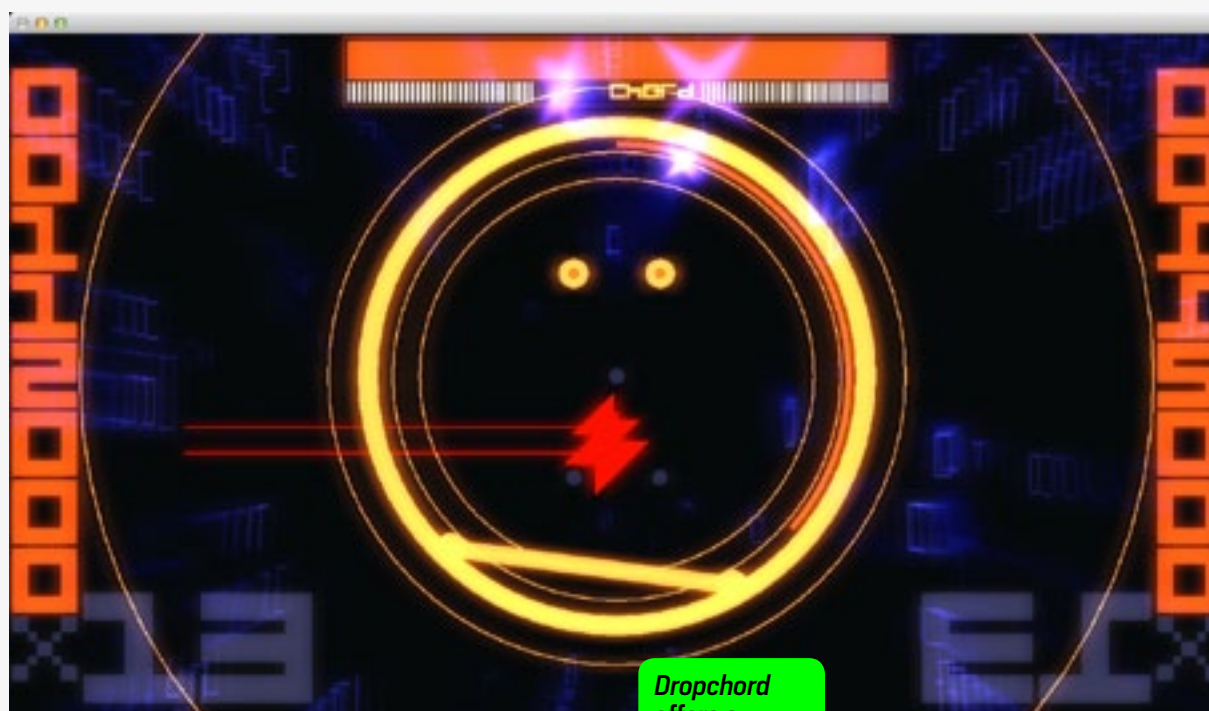
Dropchord offers a dramatic visual experience.

right to steer, suffered from similar control glitches — the game would often fail to recognize our steering input, sending us falling off the course to our doom. Lastly, there's *Block54*, a digital *Jenga*-esque tower game requiring players to carefully remove blocks without causing the tower to topple. Control inputs were accurate for the most part, but we struggled to get the in-game camera placed at an optimal angle to allow for the removal of blocks, and positioning the virtual paddles used to remove blocks proved extremely difficult. Also, despite the fact that the game recommends using one hand, we found it impossible to get the angle correct when trying to grab blocks that way, and had far better luck using a two-handed approach (though our previous statements about the game's difficulty still stand).

In addition to games, there's a wide selection of music-making apps. AirHarp is exactly what you think it is, letting users strum away on a series of digital strings, while moving your fingers towards the screen increases the reverb. AirHarp also helped us acclimate to working with our hands in space — it forced us to practice hovering and touching with more precision, so that we didn't always just scrape our finger along sequential harp strings. We did become more adept at this, but never to the point where we achieved the desired action 100 percent of the time. Chordion Conductor, meanwhile, is a genius little app for crafting songs using a variety of tempo, timbre, instrument and other settings. Plus, it has an Arpeggiator mode that automatically assembles notes in a melodic fashion as your fingers flit over digital keys. With the Arpeggiator turned on, we found it easy to create pleasing tunes. Truly, Airspace has some useful tools for the budding Mozart in your life.

Aside from games and music makers, several offerings in the Airspace Store are closer to demo "fluff" than actual programs. Flocking and Gravilux, for example, are straight eye candy. In Flocking, the tips of any extended fingers are represented as glowing orange orbs in an underwater environment, and those orbs cause hundreds of digital fish to swim around them in unison. Simi-

larly, Gravilux is essentially a physics engine demo that displays thousands of tiny particles (users can choose their color and size) in a black environment — those particles were attracted to the tips of our fingers and swirled around them as we waved our phalanges about. In both apps, the fluidity of the animations was impressive, and it's certainly cool seeing all those objects reacting to our hands, but we tired of both after a few minutes.

The other major category of apps available is educational. Cyber Science 3D lets you pull apart a human skull to identify the bones that comprise it and Frog Dissection lets you, well, dissect a digital frog (along with providing plenty of info about the amphibian's biology). Exoplanet lets you virtually explore the known universe and Molecules provides an up-close look at the molecular makeup of various compounds. In each of these, controls are rudimentary and fairly simple, but you can see the potential of the z-axis, pitch and yaw controls that the Leap provides — it allowed us to easily manipulate three-dimensional digital objects and see them from all angles in a way we've never been able to before.

WINDOWS USER EXPERIENCE

Setup on our Windows machine was largely the same as it was for Mac, so we won't rehash the process here. Once we did get set up on our Windows 8 machine, however, we skipped past the

fun titles in the app store and went straight for the serious stuff, starting with Touchless for Windows (there's an identical app built for Mac as well). Judging from its title image, which shows a finger navigating Windows 8's tile-based UI, we wondered whether this might offer an alternative to using the mouse. Heck, it could potentially even bring Windows 8 on the desktop PC more in line with the fluidity of the operating system on a touchscreen device. Alas, it wasn't to be.

Desktop control relies on dividing 3D space into two separate zones: one closer to your body, which is for "hovering," and one closer to the display, which is for "touching." In other words, it's just like hovering with a stylus before making contact with the screen on a Wacom tablet or Galaxy Note — and hence it sounds like it should be intuitive. However, in practice we found that every time we moved a finger towards the computer monitor, the cursor drooped on the vertical axis, causing a mishit. This is because it's very hard to prevent your index finger from dropping slightly as it moves away from your body — an inevitable consequence of the human elbow joint. Although practice would probably have improved the situation, we gave up after about 20 minutes due to its fairly steep learning curve and an encroaching sense that our time-limited existence on this beautiful planet was ebbing away.

Things improved when we shifted

Your interaction space is split into two zones:
the hover zone, and the touch zone.
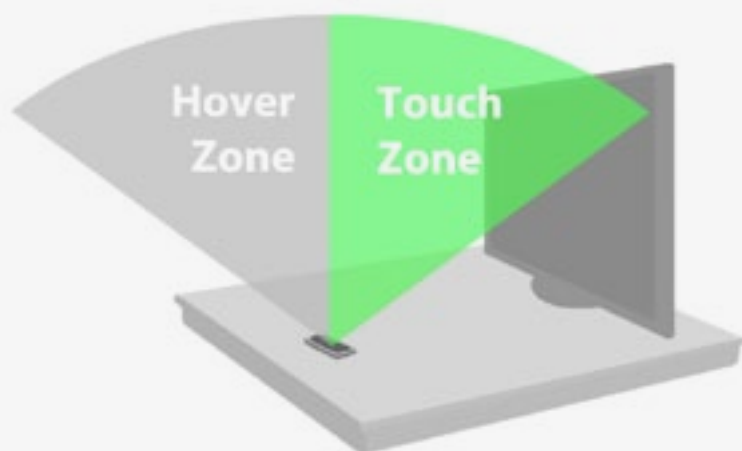
The hover zone is used for aiming and the touch zone
is used for creating touch events on the screen.

to Corel Painter Freestyle, which allows you to select different colors or brushes simply by hovering over a button for a few seconds. In this app, you only "touch" when you want to engage the brush on the paper, which avoids the need for precise button selections and therefore makes things easier. So long as you go for a masterpiece in the modernist style, with big and abstract strokes, it's a genuinely impressive experience. That's due to the way the software detects your movements on so many different axes, not just the position of your finger on the page, but also its orientation, which — for example — controls the directional flow of paint from your spray gun. The strokes on the screen might look messy, but they perhaps look more organic than what an inexperienced person could achieve with a Wacom stylus.

It was also annoying that the sensor often saw a thumb as a finger, even when we never intended for it to be registered. The only reliable way to

prevent this was to tuck the thumb behind our bunched-up fingers, so that it couldn't protrude — something that has felt instinctively wrong and unnatural ever since our first fistfight in the schoolyard.

Generally, although our control over the device did improve with time, it never became precise enough to allow for navigation of the Windows (or Mac) environment, in either the desktop or the modern UI — and that was a huge blow to the daily usability of the Leap Motion controller.

All is not lost, however. Software updates could conceivably grant more control over how the device responds to our gestures — perhaps by allowing us to set the sensitivity of different axes independently and saving these settings as profiles — in order to minimize the impact of naturally arced motions. Perhaps some kind of thumb rejection is in order as well, to prevent us from having to tuck it inside our fist.

The Leap Motion did receive one update while we toyed with it, so we know its makers are there in the background, working on improvements — there's just no guarantee as to whether or when they'll really deliver a "fix" for these issues.

WRAP-UP

All in all, the Leap Motion controller is more about potential than anything else. While it provides a new means for computational control unlike any-

Leap uses infrared rather than depth tracking.

thing else we've seen, it's clear that it's not cut out to replace a touchscreen or mouse as a primary input device. Not yet, anyway. Some developer may well figure out a way to take full advantage of the Leap's capabilities with a novel UI, but for now, it's best suited for creative pursuits, not productivity. The initial software library for Leap is relatively

limited, but as the number of folks with Leap controllers grow, so will the amount of attention it'll receive from developers. And, there are enough apps in the Airspace Store that most folks will find at least a few to their liking. Eighty bucks for a glimpse of what could be the future of computer controls? Not a bad deal, but if you do dive in, we'd advise you think of it as an entertainment expense, not a business one. Ⓓ

Sharif Sakr contributed to this review.

Michael Gorman is a Senior Associate Editor at Engadget, attorney, Hokie and 8-bit gaming enthusiast. He likes dogs, too.

BOTTOMLINE

LEAP MOTION CONTROLLER

$80

PROS
- Fine-tuned motion control for up to 10 fingers at once
- Simple, space-efficient hardware
- Well-designed app portal

CONS
- Limited selection of useful apps
- Not yet a valid alternative to a mouse or touchscreen
- A wireless connection would be nice

BOTTOMLINE
The Leap Motion controller is well-constructed and relatively inexpensive. However, it's more a novelty than a tool — best served as a means for entertainment, not productivity.

NOKIA LUMIA 1020

Nokia's **Lumia 1020** takes over where the 808 PureView left off, adding WP8 and a slimmer profile as it tries to blur the line between smartphone and quality camera
By Brad Molen

There was no shortage of stunned faces in the audience when Nokia CEO Stephen Elop announced the 808 PureView at Mobile World Congress 17 months ago. Who would have thought a Symbian-powered device would be a show-stealer — in *2012*? After all, Elop had all but declared the platform dead one year before, and the idea of a smartphone with a 41-megapixel camera was an industry first. Questions lingered immediately after: how is that actually going to work on a phone? Why Symbian? And when would it show up on Windows Phone,

Nokia's OS of choice?

As it turns out, the 808 PureView was the culmination of five years' worth of imaging experts putting their heads together, and Nokia wanted to get the proof of concept out the door while getting the innovative tech ready for Windows Phone. A few months after the 808's release, we started seeing the first fruits of this effort in the Lumia 920, but there was work yet to be done. Finally, the time has come for the company to launch the 808's WP8 counterpart, the Lumia 1020, and it's launching on AT&T today (July 26th) for $300 as a US exclusive. We were able to peel ourselves away from taking pictures long enough to jot down a few thoughts, so shoot on ahead to take a closer look.

HARDWARE

Haven't immediately skipped down to the imaging section? We're happy to hear, because even though the camera is of crucial importance to the success of the 1020 — which must have initially been named the 909, since that's what it's called on the About screen — the experience you have using the rest of the phone is also vital to your overall enjoyment of the device. Take the hardware, for ex-

ample: not unlike the vast majority of Nokia's high-end Lumia products, it's extremely well-built. It uses a unibody polycarbonate chassis, which gives us great confidence in its durability. The Gorilla Glass 3 on the front of the 1020 is flush with the edges, so you don't feel any interruption when running your fingers from one end of the phone to the other. Given its placement, the display likely stands a better chance of survival than most when the handset is dropped on its side. (We can't say the same about those times it gets dropped face-down, so be careful.)

The Lumia 1020 comes in three colors (yellow, black and white), each with a matte finish and a coating that's both fingerprint- and dirt-resistant. We much prefer this over a glossy phone any day, and while we didn't give the handset a full nature facial to test that second feature, we can at least confirm that finger-

The unibody shell did an amazing job at repelling fingerprints.
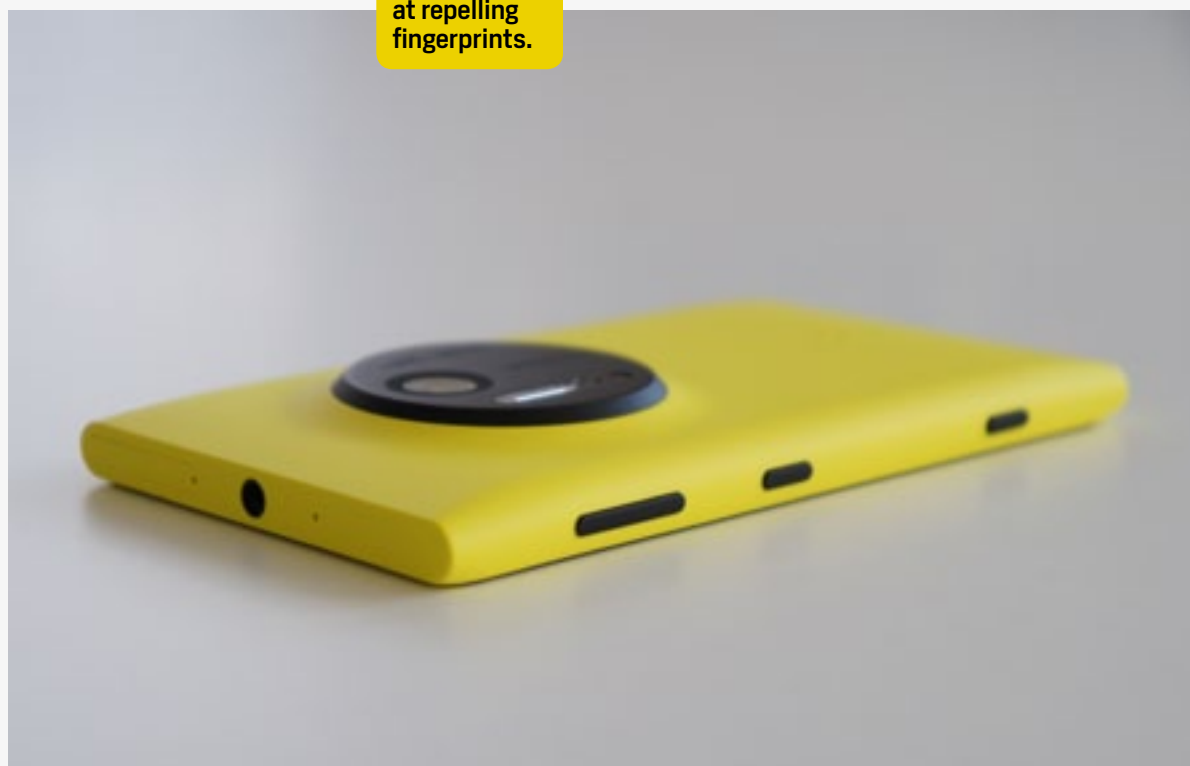
The blacks of the bezel and screen seem to merge seamlessly.

prints barely made an appearance during our time with the device. Additionally, the sides and back of the 1020 are smooth and rounded, much like a well-polished pebble, and the top and bottom are flat, which is fantastic if you ever want to position the phone upright. In many respects, it looks like a cross between the Lumia 800 and 920. That's not necessarily a bad thing, but it does have a drawback or two. Sadly, the matte finish wasn't enough texture to provide us with a better grip, so the phone's ability to slip out of my hands didn't go unnoticed — *especially* when trying to remove it from my pocket.

The good news is that at 5.57 ounces (158g) the 1020 actually weighs significantly less than the 920 (6.53 ounces), whose heft was one of our biggest gripes when we reviewed it. It's also 10.4mm (0.41 inch) thick — abysmal when compared to most other high-end devices currently on the market, but still 0.3mm thinner than the 920. Unfortunately, it's also 0.6mm wider. This may not sound like much, but it makes a big difference in terms of how it feels in-hand, *especially* when you factor in the large camera module that takes up so much space on the rear side. Yes, the two elements make for a rather awkward hand-held experience; when the smartphone rests normally in your palms, your fingers will drape uncom-

fortably across that module in the back.

If you've used the Lumia 920, it won't take you long to figure out where everything is on the 1020. The micro-SIM tray and 3.5mm headphone jack sit atop the device, with the volume rocker, power button and hardware shutter key (all aluminum) situated on the right. Down below, you'll find the micro-USB port and a speaker grille; what sets it apart from the 920 is the addition of a lanyard hole and a change in how the speakers are laid out. The front features a 4.5-inch WXGA display, with a 1.2-megapixel, wide-angle, front-facing camera in the top-right corner, an earpiece just to its left, and — on our AT&T-branded review unit — a globe logo sitting by itself in the top-left corner. (This is the extent of any exterior carrier branding, fortunately.) The standard suite of capacitive buttons (back, home and search keys) can be found below

The screen, just as you'd expect.

Moving on to the back, it's hard not to notice the monstrous camera bump taking up tons of space. It's an aluminum, circular module with the lens on top and two flashes — LED for video and focus assist, and xenon for stills — lining the left side. The rest is taken up with Nokia's logo and lettering signifying its megapixel prowess. There's no mistaking the bump, to be sure, as it protrudes proudly from the phone's chassis; this means the 1020 won't be able to sit flat on its back when you want to place it on a table or other surface. Of course, it's still much thinner (albeit larger and flatter) than the 808 PureView's module, so we're hoping that future generations of the device will get progressively less awkward.

The Lumia 1020 comes with 32GB of internal storage. This is normally plenty of space for most users, but be careful if you plan on taking full advantage of the phone's numerous camera features; after taking lots of pictures over the course of two days, we easily amassed a couple gigabytes of images. We'd love to see a 64GB option for the enthusiasts out there (there have been reports that it's heading to Telefonica in Europe and Latin America as an exclusive), but as this isn't

The 1020 alongside some of its Nokia stablemates.
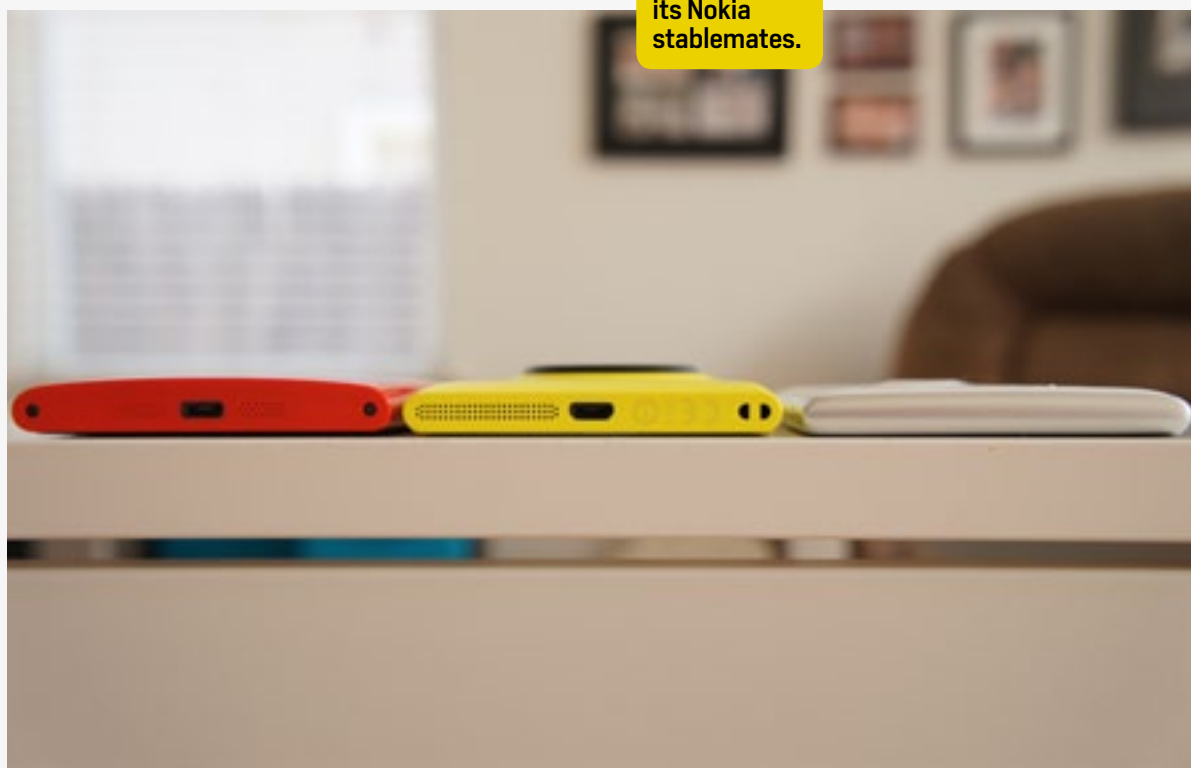
likely to find its way stateside anytime soon, just make sure you're regularly backing up your prized shots.

The 4.5-inch WXGA (1,280 x 768) display has the same resolution as the Lumia 920 and 925, though the 1020 uses the same AMOLED "PureMotion HD+" panel as the latter (the 920's is LCD). And it's certainly every bit as beautiful to behold as before. Thanks to the fact that the blacks in the screen are nearly indistinguishable from the bezel, the display itself feels a bit more expansive than normal. You also have a few options at your disposal to adjust not only the master brightness setting, but also the sunlight readability, touch sensitivity and Lumia color profile (this involves tweaking the saturation and temperature of the color being shown on the screen). The viewing angles are incredibly wide; the screen is easy to see in direct sunlight; and the colors pop without overdoing it on the saturation.

For radios, the AT&T version (RM-877) has quad-band LTE (bands 2, 4, 5 and 17, though you won't use most of them until AT&T enables them. It also features quad-band HSPA+ (850 / 900 / 1900 / 2100) capable of speeds up to 42 Mbps and quad-band GSM / EDGE (850 / 900 / 1800 / 1900). According to the FCC docs, this unit technically also features AWS HSPA+, but it appears to be disabled on the AT&T units. Additionally, the 1020 features NFC, Bluetooth 3.0 and USB 2.0.

SOFTWARE

Windows Phones require very little explanation on the firmware side, since Microsoft maintains a consistent user experience across the board. Because of this, there isn't much to surprise users who are already familiar with the Live Tile-smattered mobile OS; you already know what to expect, and we won't go into a lot of detail on the platform's features here.

With that said, the Lumia 1020, much like most of Nokia's Windows Phones, includes a full suite of OEM- and carrier-specific applications — more than 20, in fact. This includes Nokia Care, Music, Pro

There are a slew of apps added, but all easily uninstallable.

Cam and Smart Cam, as well as a set of Here-based programs, such as City Lens, Drive+ Beta, Maps and Transit. On the AT&T side, you'll see Address Book, FamilyMap, Locker, Navigator, Radio, Mobile TV, myAT&T and YPMobile, all of which can be easily uninstalled if you don't find any use for them. There's also ESPN Hub, Wallet and a bunch of imaging-centric lenses, which we'll discuss in more detail in the next section. The 1020 also offers the same quick-glance screen that we saw on the Lumia 925, which allows users to check the time while the screen is off; you can disable this feature or, if you prefer, add a night mode that dims the glance's brightness automatically during the hours of your choice.

CAMERA

The protruding module. The wondrous sounds of a mechanical shutter. Two different types of flash. The list goes on. You can't *not* notice how central a role the camera plays in the Lumia 1020's existence. Its whole purpose is to ensure that you, dear photography enthusiast, can enjoy the closest thing to a DSLR-like imaging experience on a smartphone. Perhaps likening it to a top-notch Canon or

Nikon is a bit much — we have a hard time believing that a phone is ready to replace professional-quality equipment — but devices like the 808 PureView and the 1020 are giving some of the best point-and-shoots a run for their money. Such a possibility was a laughable concept at best a few years ago, so how is Nokia pulling it off?

If you've read up on the 808 and researched the idea of PureView, you'll realize that Nokia's second-generation approach to the tech isn't foreign. It's simply applying many of the clever imaging principles already used in the 808 and improving them, adding them to a more relevant operating system and throwing in a few additional features to make it even more tantalizing. We figure it's best to start from the beginning and offer a brief history lesson on what PureView is all about.

Nokia needed only to adapt the PureView principles to the 1020.

HOW IT WORKS

The 808 PureView camera boasted a whopping 41-megapixel CMOS, which sounds intimidating — after all, the mainstream smartphone market still hadn't begun producing devices with 13-megapixel cameras yet, so 41 felt like an awfully big leap. So what's the point of having so many pixels at one's disposal? In short, the magic is in oversampling. While it's possible to snap 38-megapixel (and 34-mega-pixel wide-angle) images at will, the 808 has a "creative mode" which takes lower-res shots — eight, five and three megapixels, to be precise. Not only are these images easier to share, the phone oversamples the images, which means it combines several pixels to create one high-quality superpixel. The idea behind this is to add sharpness, reduce noise, eliminate Bayer-pattern problems and improve low-light performance. It also helps the camera achieve

SPECIFICATIONS	LUMIA 1020	LUMIA 925	LUMIA 920	808 PUREVIEW
PRICE	$300 ON CONTRACT	€469 ($610) OFF-CONTRACT IN EUROPE	$99 ON CONTRACT	$414.99 OFF CONTRACT ON AMAZON
PROCESSOR	DUAL-CORE 1.5GHZ MSM8960	DUAL-CORE 1.5GHZ MSM8960	DUAL-CORE 1.5GHZ MSM8960	1.3GHZ
MEMORY	2GB	1GB	1GB	512MB
DISPLAY	4.5-INCH PUREMOTION HD+ OLED	4.5-INCH PUREMOTION HD+ OLED	4.5-INCH PUREMOTION HD+ IPS LCD	4-INCH CLEARBLACK OLED
RESOLUTION	1,280 X 768	1,280 x 768	1,280 X 768	640 X 360
GLASS	GORILLA GLASS 3	GORILLA GLASS 2	GORILLA GLASS 2	GORILLA GLASS
PIXEL DENSITY	334 PPI	334 PPI	334 PPI	184 PPI
STORAGE	32GB	16GB or 32GB	32GB	16GB + MICROSD
PRIMARY CAMERA	41-MEGAPIXEL OIS F/2.2 6-ELEMENT LENS, LED + XENON FLASH, BSI, 1/1.5", 1.12-MICRON PIXEL SIZE,	8.7-MEGAPIXEL OIS F/2.0 6-ELEMENT LENS, DUAL-LED FLASH	8.7-MEGAPIXEL OIS F/2.0 5-ELEMENT LENS, DUAL-LED FLASH	41-MEGAPIXEL F/2.4 5-ELEMENT LENS, LED + XENON FLASH, FSI, 1/1.2", 1.4-MICRON PIXEL SIZE

NOKIA LUMIA 1020

SPECIFICATIONS	LUMIA 1020	LUMIA 925	LUMIA 920	808 PUREVIEW
SECONDARY CAMERA	1,280 x 960	1,280 x 960	1,280 X 960	480P
VIDEO RECORDING	1080P	1080P	1080P	1080P
CELLULAR	HSPA+, LTE	HSPA+, LTE	HSPA+, LTE	HSDPA
WIFI	802.11A/B/G/N	802.11A/B/G/N	802.11A/B/G/N	802.11B/G/N
BLUETOOTH	3	3	3	3
ORIENTATION	MAGNETOMETER, ACCELEROMETER, GYROSCOPE	MAGNETOMETER, ACCELEROMETER, GYROSCOPE	MAGNETOMETER, ACCELEROMETER, GYROSCOPE	MAGNETOMETER, ACCELEROMETER
NAVIGATION	A-GPS, GLONASS, WLAN NETWORK POSITIONING	A-GPS, GLONASS, WLAN NETWORK POSITIONING	A-GPS, GLONASS, WLAN NETWORK POSITIONING	A-GPS, WLAN NETWORK POSITIONING
CONNECTIVITY	NFC	NFC	NFC	NFC
WIRELESS CHARGING	QI (WITH OPTIONAL SNAP-ON COVER)	QI (WITH OPTIONAL SNAP-ON COVER)	QI	N/A
SIM STANDARD	MICRO-SIM	MICRO-SIM	MICRO-SIM	MICRO-SIM
BATTERY	2,000MAH	2,000MAH	2,000MAH	1,400MAH
WEIGHT	157.6 GRAMS	139 GRAMS	185 GRAMS	169 GRAMS
DIMENSIONS	130.3 X 71.4 X 10.4 MM	127.5 X 70.5 X 8.5MM	130.3 X 70.8 X 10.7MM	123.9 X 60.2 X 13.9 MM
COLORS	WHITE, BLACK, YELLOW	SILVER, GRAY	WHITE, BLACK, GRAY, YELLOW, RED	WHITE, BLACK, RED

another superpower: lossless zoom. In other words, you can zoom in on an object without losing detail and resorting to interpolation.

Fast-forward to the Lumia 1020, which takes the PureView tech and im-proves upon it. Instead of having to choose between creative mode and high-res shots, the 1020 now takes both simultaneously, giving you a 38-megapixel photo (34 megapixels for wide-angle) *and* an oversampled 5-megapixel version

with lossless zoom as well. The camera benefits from a six-element lens array (compared to the 808's five), which consists of five plastic lenses and one made of glass. With the new device also came a shift from an FSI sensor to BSI and a wider aperture (it's now f/2.2, compared to f/2.4 on the 808). Both of these factors equate to better low-light performance, but that's not all: the phone also offers barrel-shift optical image stabilization (OIS), thanks to a set of ball bearings that are moved by tiny motors anytime the gyroscope detects shaking. Pro tip: activate the camera and wobble the phone to hear the various parts moving around inside.

Let's dive into more technical specs. At 1/1.5 inch, the sensor is significantly larger than any other flagship device (the GS4's is 1/3.06 inch, whereas the One's is 1/3 inch), but it's slightly smaller than the 808's 1/1.2-inch offering. The size of each pixel is 1.12μm, which is the same as the GS4, but smaller than the 808. The 1020's 35mm-equivalent focal length is 26mm, which is about the same as the 808, whose 35mm equivalent is 26mm for 16:9 and 28mm for 4:3. Minimum focus distance for macro shots is set at 15cm.

Curiously, the Lumia 1020 comes with a Qualcomm Snapdragon S4 Plus chipset. This is standard fare for Windows Phones, but it's interesting to note that the SoC technically doesn't support such high-resolution cameras. According to *Anandtech's* Brian Klug, Nokia collaborated with Qualcomm to

do a complete rewrite of the chipset's imaging stack in order to make everything work properly. With that said, a future update to the platform referred to as GDR3 will reportedly support Snapdragon 800 chipsets that are capable of getting up to 55 megapixels, which is a pretty solid indication that future generations of Nokia's PureView lineup will continue to increase in resolution and features.

USER INTERFACE AND LENSES

The stock Windows Phone camera application is for chumps, and Nokia's goal is to prove it. While you can use the vanilla app if you prefer, we have no idea what benefit you'd get from doing so — images taken within the app are limited to five megapixels, regardless of which aspect ratio you choose. The default lens featured on the Lumia 1020 is called the Nokia Pro Cam, and it's the most comprehensive WP8 imaging app we've ever used (and arguably one of the best on any platform). The user experience is pretty intuitive, and it has more manual adjustment options than we're used to enjoying. Drag the virtual shutter key slightly to the left and something that looks like your grade school's diagram of the Solar System appears before your very eyes. It's set up as a series of sliders, each one representing a different adjustment setting: white balance, manual focus, ISO (up to 3200), shutter speed (1/16,000 to 4 seconds) and EV are all here, many of

available on the top of your viewfinder, and can be accessed individually simply by pressing down on whichever one you want. (As an aside, this app will be coming to the Lumia 920, 925 and 928 after they receive an update to WP8's Amber refresh.)

You can switch from stills to video by sliding your finger down on the shutter key. To work the digital zoom, slide your fingers up and down on the viewfinder. In the top-left corner, you'll find options to either edit your last shot or go directly into the camera roll. An icon in the bottom-right corner lets you switch to other lenses, such as Cinemagraph, Panorama, Smart Cam or others. Lastly, a series of three dots in the top-right corner is your go-to place for settings and miscellaneous menu options: this is where you can switch to the front-facing camera, enable shutter delay and change the shortcut assigned to your hardware shutter button. This is also where you'll find the toggle to go back and forth from standard 38-megapixel images to wide-angle 34-megapixel ones (and vice versa, of course). Additionally, you can snap just 5-megapixel shots if you don't want a high-res shot hogging up storage space. Frankly, this toggle is the only letdown about the user interface — we'd much prefer the ability to switch back and forth directly from the viewfinder, instead of taking three extra clicks to get the same desired effect.

Camera settings are shown in concentric rings.

which have the ability to adjust in real time. Try changing the white balance settings, for instance, and the viewfinder instantly shows you what your picture should look like.

The entire process couldn't be smoother, and it helps ensure that you're not spending precious minutes attempting to properly frame your shot. (Video has a similar wheel-style setup, by the way, but it only features white balance and focus.) However, there are situations in which even this method takes too long and you just need to tweak one particular aspect of your shot; in that case, all of the settings are

As briefly mentioned earlier, Nokia's also thrown in its Smart Cam lens, already available on the Lumia 925. It's worth a quick mention, at least, since it will undoubtedly play a significant role in how you use the 1020's camera. Smart Cam takes a series of burst shots over the course of a few seconds; from there, you can grab the best shot, an action shot (think Drama Mode for the Galaxy S 4), add blurring to emphasize motion or remove photobombers (just like Eraser Mode on the GS4). Fortunately, you can do multiple things with the same series of photos: for instance, you can save your action shot and then go back and do something else.

Creative Studio is an image-manipulation app included as part of the overall imaging package on the 1020. Introduced on the Lumia 925, it offers a few post-production, Photoshop-like techniques to add a little extra flair to your high-res photos: you can manipulate focus, blur, color (giving you the chance to highlight specific hues) and make a collage, among other things.

All of your saved photos, regardless of which Nokia lens or app you use to create it, get aggregated into the camera roll. Each of them can be edited after the fact by clicking on the app link that shows up underneath. The same goes for high-res photos: while the camera roll only features the 5-megapixel versions, head into the edit option to behold it in all its full-res glory. Speaking of which, one of the editing features we

enjoyed was the reframe option. This gives you the chance to straighten out crooked pictures, rotate your image or change the aspect ratio (3:2, 1:1, 16:9 and 4:3 are all there).

Additionally, the unveiling of the 1020 brought about the introduction of Nokia's new imaging SDK, which is currently in beta and offers developers access to many of the PureView features and APIs; in fact, Creative Studio was developed using the SDK. Devs can take advantage of partial JPEG decoding, the ability to offer cropping and reformatting, full WP8 compatibility and up to 50 filters and effects.

IMAGING PERFORMANCE

So we've gone into a lot of detail about how the Lumia 1020 camera works, which undoubtedly has a lot of you drooling. Nokia has a lengthy history of backing up its boastful imaging claims, and fortunately that reputation continues with the 1020. Simply put, the camera is stunning. In most situations, the automatic settings work well, especially when it comes to white balance, low light and focus. But the camera shines even brighter if you get adventurous and start tinkering with manual settings. Images taken in the dark turned out with more light, more detail and less noise than the HTC One and 808. The lossless zoom on the 1020 completely blew us away; we could legibly see signs from a distance of over 100 yards, and we were able to zoom in

The 1020's camera really does offer excellent quality.

on faces of people who were barely noticeable in the original image. We were also very impressed by the vast amount of detail in every shot. As you can imagine, there's a lot to love.

No camera is perfect, however. When taking pictures in the shade, we noticed that colors popped a little too much compared to other flagship cameras we tested — in fact, there were times they didn't appear natural (though this could potentially be fixed in post-processing). We also noticed that the 1020 struggled with the high end of the dynamic range at times; for instance, the camera was unable to pick out details in the wall of a sunlit building that the 808 and Galaxy S 4 had no problem seeing. The 1020 lacks a neutral density filter, a feature the 808 possessed that aids the camera in really bright light; unfortunately it takes up space, which is a possible reason why it was left out in this iteration.

Of course, many of these observations are only potential problems when you're using auto mode. Most people interested in buying this phone are likely a bit more savvy in the imaging department and are willing to play around with the settings, and this is where

the 1020 makes the biggest difference. ISO, shutter speed, white balance, EV and manual focus are easily tweakable, which means you have free creative reign in making the camera take whatever photos you want. It's amazing what just a few minor adjustments can do — especially in low light. We'll continue to experiment with the camera's capabilities and report our findings in an upcoming feature.

VIDEO QUALITY

By default, the 1020 records video in 1080p and at 30 frames per second (encoded at a bit rate of 20 Mbps). Since the phone is all about customizable options and manual control, however, you can also set your movies to record at a resolution of 720p along with frame rates of 24 and 25 fps (for both resolutions). The lossless zoom applies to video as well as stills: full HD is capable of 4X, while 720p bumps that number up to 6X. Rounding out the manual adjustments are white balance and focus lock, as well as a tweakable audio bass filter that lets you tune out lower frequencies — ultra handy in cases of wind and traffic.

We were impressed by how smoothly the camera was able to handle jostling, shaky hands and a little panning. While phones with 1080p video capture are a dime a dozen in this industry, very few actually do a good job of making you feel like you're actually watching a high-def video; fortunately, the 1020 is

one of those few. The camcorder is capable of doing either continuous, macro or infinity focus, but we would've liked the opportunity to do our own manual adjustments for those few cases in which we wanted to focus on different parts of the screen or when the camera didn't focus properly on its own.

The audio is encoded at a bit rate of 256 Kbps and a sampling rate of 48KHz, but we found a bug: any audio we captured using the Pro Camera lens wound up with one dominant channel. In other words, video playback sounded like it had been recorded in mono, despite the fact that an ever-so-tiny amount of audio crept out of the second channel. We didn't experience any of these problems in the stock camera app, so we'll get a new unit from Nokia shortly to see if this is just limited to our own device.

PERFORMANCE AND BATTERY LIFE

So how does the phone perform, aside from the camera? Pretty well, but was there any doubt? Regardless of your views toward (or against) Windows Phone, we've rarely encountered any problems on WP8 — especially when a dual-core Snapdragon S4 is involved. Fortunately, that's true of the 1020 too: it sports an S4 Plus chipset with Adreno 225 GPU and 2GB RAM, so it's certainly got some *oomph* behind it. Of course, given the raw power necessary to process images, a couple gigabytes almost seem like the minimum requirement. As far as

BENCHMARK	NOKIA LUMIA 925	NOKIA LUMIA 920	NOKIA LUMIA 1020
WPBENCH	216	**227**	223
BATTERY RUNDOWN	**3:55**	2:55	2:12
SUNSPIDER 1.0 (MS)	905.4	**903.2**	906.2
ANTUTU (*GPU TEST OFF)	**11,819***	11,457*	11,084 (9,874*)

SUNSPIDER: LOWER SCORES ARE BETTER

normal tasks go, the screen is responsive; the phone seldom stutters; and multitasking is incredibly smooth.

The 1020 benefits from a 2,000mAh battery, which should serve most power users quite well; Windows Phones have a reputation for being power-efficient, and the 1020's AMOLED panel doesn't require quite as much energy to operate. In most cases, we were able to use the device as we normally would — this includes taking a ton of pictures and videos for this review — for around 12 to 14 hours before it died. Granted, the WP-Bench battery endurance test indicates that battery life is weaker with processor-intensive activities than the 920 or 925, but with normal usage, runtime still appears to be better than what we usually see on other platforms. As an additional note of caution, it appears that the battery drains faster when you're making manual imaging adjustments, as opposed to when you let the camera make the decisions for you.

The speakers are perfectly aver-age for listening to music and movies, mainly due to the volume. We typically didn't have a problem hearing details in podcasts or songs when the phone was within a foot or two, but as soon as we stepped away from it to walk across the room, we noticed that the lows were barely audible at all — even when the speakers were facing our direction without any obstruction. While calls were also pretty clear, the voices on the other end sounded slightly tinny, though it wasn't so bad that it distracted from our conversation. Lastly, GPS was able to find our location within just a few seconds.

Not all is bunnies and butterfly kisses with the 1020's general performance, as we came across a couple rather significant bugs that could be a cause for concern. First, we were never able to get the mic to work when we were on speakerphone, even after making several test calls. Secondly, on one occasion, our review unit's buttons completely froze — we could use the touch screen, but

none of the hardware or capacitive keys responded in any fashion. Taking the SIM out and putting it in, an action that normally forces the phone to reboot, did nothing; we were only able to get it to work properly after holding the down volume, power and shutter keys for several seconds. We'll receive an extra review unit to test out these oddities and see if we're able to replicate the bugs.

WRAP-UP

We've been waiting a long time for the 808 PureView to get a Windows Phone counterpart with the same (if not better) imaging prowess. Finally, it's here. Now that we've had the opportunity to use the device, we can confidently say that the Lumia 1020 is the best Windows Phone device to date. If you're a WP8 user who enjoys crafting the best possible photographs, you need to make the jump, even if you are paying a premium for the camera.

But what if you have to make the switch from another platform? That question is unfortunately much more difficult to answer. While Windows Phone has come a long ways since its days as a nascent OS, Android and iOS users — many of whom are likely content with the selection of apps and services currently offered to them — will need to weigh the pros and cons carefully. Plenty of flagship phones have really good cameras. They just aren't *this* good. So is it worth leaving your comfort zone and forging a new path to imaging bliss? If taking fabulous glamour shots are that important to you, the decision to switch (or not to switch) has never been so tempting.

Edgar Alvarez contributed to this review.

Brad is a mobile editor at Engadget, an outdoorsy guy, and a lover of eccentric New Wave and electro. Singer and beatboxer.

BOTTOMLINE

NOKIA LUMIA 1020
$300
(ON CONTRACT)

PROS
- Best-in-class imaging experience
- Good battery life
- Smooth performance
- Solid build quality and materials
- Beautiful display

CONS
- Awkward and slightly uncomfortable to hold
- Has a few bugs

BOTTOMLINE
The Lumia 1020 is the best Windows Phone we've used so far and offers the best camera in the industry, though it's a little difficult to hold comfortably.

100
Gadgets We Love

It's been nearly two years since we pushed the publish button on the first issue of Distro and in that time, we've tapped, fondled, photographed and destroyed more than our fair share of gadgets and gizmos. Week in and week out, we've worked tirelessly and sometimes deliriously (here's looking at you, CES) to keep you up to speed on the latest in consumer technology. And while we've just hit 100, the cogs of the weekly magazine machine have not stopped turning. In an effort to bring you our most gadget-filled issue yet, we've compiled a list of a few of our all-time favorite devices.

Here's to the next 100!
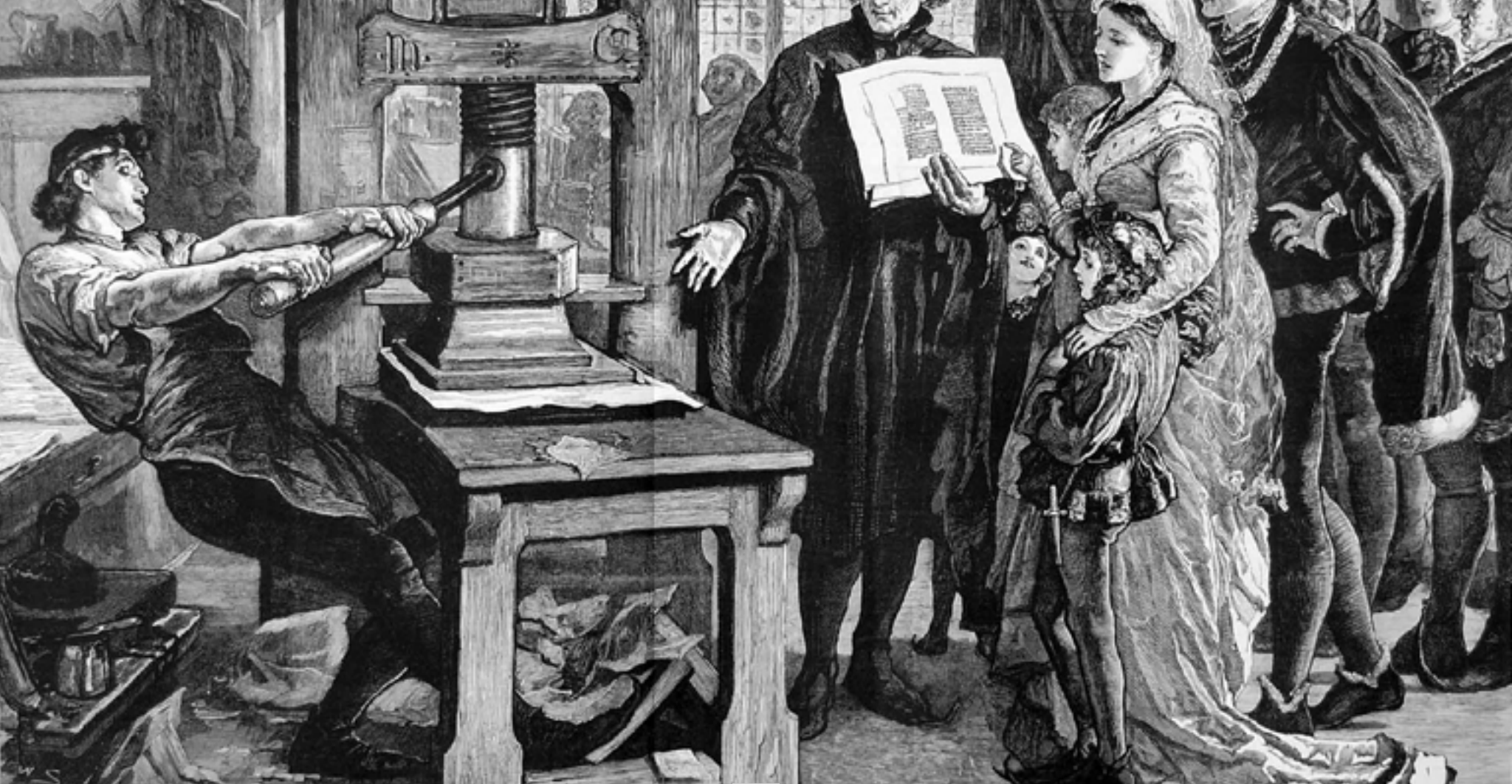
Gutenberg Printing Press

As journalists, we shudder to think that taglines like "All the news that's fit to *copy out by hand*" could have been a thing.

1877
EDISON PHONOGRAPH
Sound recording and playback all in one device — heck, not even the first iPods could do that.
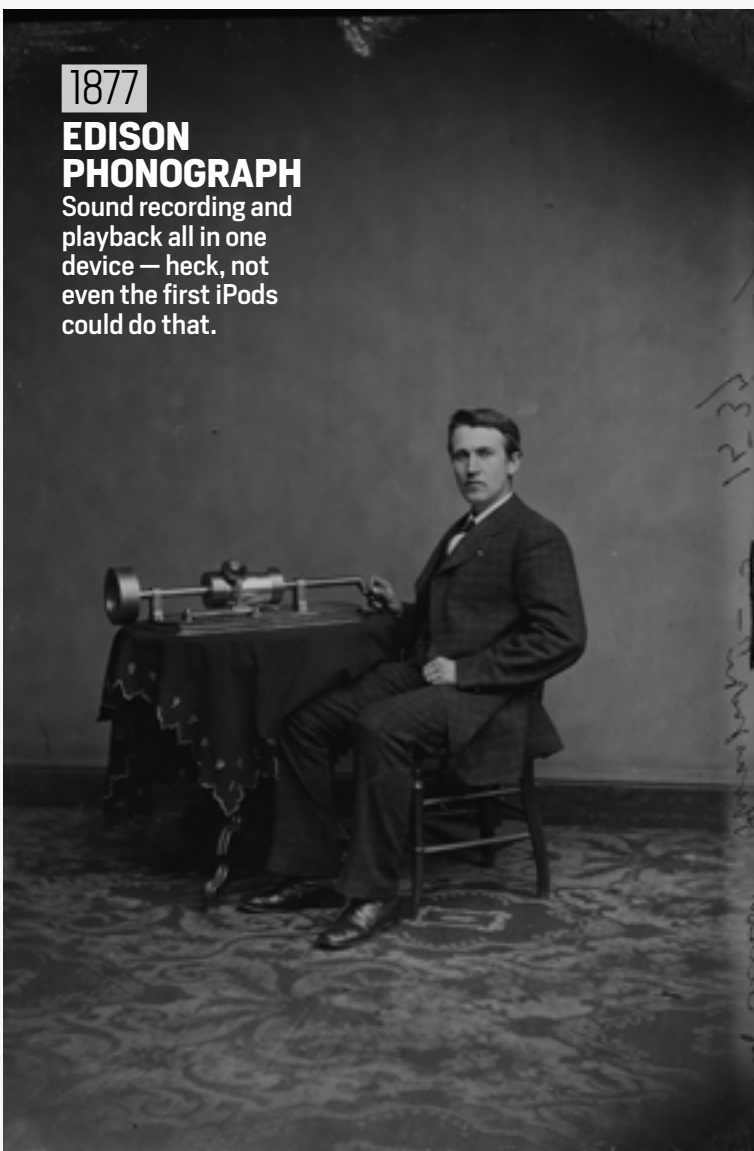
1937
VITAMIX
The Vitamix, making things blend since the '30s.
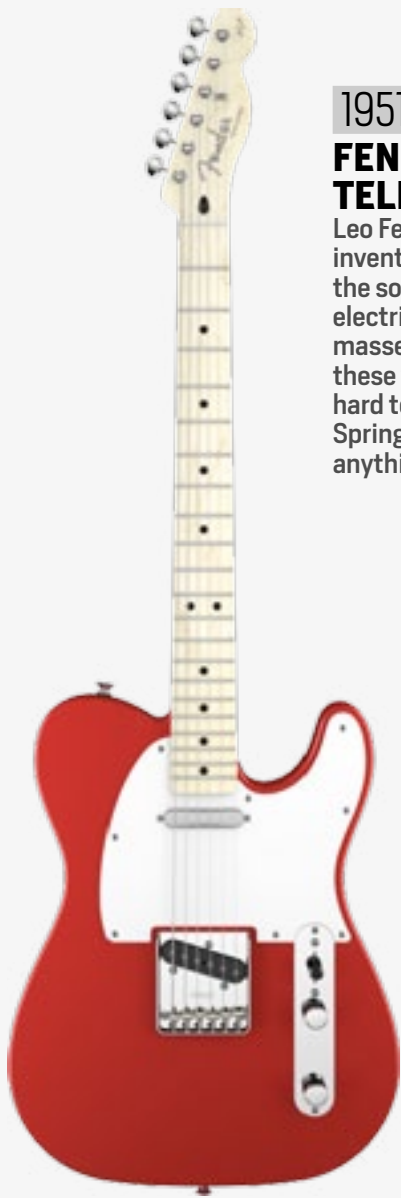
1951
FENDER TELECASTER
Leo Fender's invention brought the solid-body electric guitar to the masses — and all these years later, it's hard to imagine Bruce Springsteen playing anything else.

1978
2-XL
Man, this wisecracking little quiz-bot would tell some awful jokes, but you could learn a thing or two about math, science and even Mr. Spock. You just had to have the right 8-tracks on hand.

1977
Atari 2600

"Many a night was spent laid out across the couch shooting at asteroids, hopping across alligator heads and firing a Zorlon Cannon. Life was good." — *Jon Turi*

1978

Technics SL-1200MK2

"I've had a set of these decks for over 20 years and I'm still amazed at the magnetic drive technology and the fact that they've survived gigs in basements, forests and on rooftops, *and* still work flawlessly." — *Jon Turi*

1980

Roland TR-808

Not only was the 808 one of the earliest programmable drum machines on the market, but its bone-shaking sub-bass has been setting off car alarms for decades.

1978

SPEAK & SPELL

The little computer that helped teach us to read also got *E.T.* on the line to his home planet. How many gadgets can say that?

1979

SONY WALKMAN

It added a bit of swagger to our walk, helped pass the time and boosted our workout, all by being our very own portable soundtrack machine.

1982

COMMODORE 64

"I had to sneak some time on my brother's Commodore 64 to play with *Eliza*, a text-based AI therapist program that could mimic human conversation and I'd throw all kinds of nonsense at it." — *Jon Turi*

1982
COLECOVISION

"It was my first console and the first game I ever played on it was *Donkey Kong*. I still remember the complete shock and joy when I discovered the teleport from the bottom of the first broken steps on the first level. No internet, no books and no cheat sites existed. Glory."
— *Sean Cooper*

1983
Apple //e

Before many of America's children stomped their first turtle shell with a tiny Italian plumber, they were hunting deer and dying of dysentery in the name of education. The Apple //e enabled *Oregon Trail* and so much more — it forded the rough waters separating children from the world of computers.

1983
Apple Lisa

Marketed as "the most powerful personal computer available," Apple aimed this PC at the business market with app icons and a streamlined UI that was deemed "so advanced, you already know how to use it."

1984
IBM Model M Keyboard

"Call 'em "clicky" if you must, but serious typists know that there's nothing like a mechanical spring keyboard, and the Model M is the indestructible granddaddy of them all." — *Terrence O'Brien*

1984
SONY DISCMAN
Originally hitting shelves in 1984 as the D-5 model, the Discman series had a pretty good run over the years, saving the world from chewed-up cassette tapes, improving audio quality and welcoming us to the *joy* of digital skips.

1989
GAMEBOY
What the NES did for the console, the Game Boy did for its portable counterpart. No wonder Nintendo kept churning the pioneering system out in one form or another until 2008.

1989
TASCAM PORTASTUDIO 424
What do Wu-Tang Clan and Bruce Springsteen have in common? The Portastudio. The line of tiny recording decks hit its peak with the 424, a four-track version that was cheap enough that basically any teenager could whip up a demo with just their bar mitzvah earnings.

1985
NES
It's hard to imagine there being much of a video game industry without the original Nintendo console. This is the system that saved gaming and gave us so many franchises that continue to be popular to this day.

1986
POLAROID SPECTRA
Polaroid really knew how to push our instant-gratification buttons, giving us tangible photographs after just a few minutes wait. Fanning or blowing on the fresh prints supposedly didn't speed up the development process, but it certainly passed the time.

1991
Super NES
Arguably the greatest console of all time, the SNES took its predecessor's lead and ran with it, beefing up graphics and power, while offering up one of the greatest libraries in all of gaming.

1992
COMMODORE AMIGA 600

Growing up, this was the computer that everyone wanted — letting you do your homework one minute and rock out with killer games like *Lemmings* and *Bart vs. The Space Mutants* the next.

1993
Amstrad Mega PC

It was a Mega Drive (Sega Genesis) and PC. Together. In one. Mega PC. In beige.

1995
PLAYSTATION

Sony's PlayStation sure sounds like a device meant for children, but it enabled games as a medium to excel far beyond the world of goombas and princesses. The polygonal worlds of PlayStation games imbued Aerith's death with meaning, and offered a sense of terrifying speed on the Nürburgring. Nearly 20 years later and the brand name still represents innovation in gaming.

1992
Sony Mini-Disc Player

Beginning with the MZ1 in 1992, Sony offered a new level of quality and portability for audio with its MiniDisc players. They served well for casual listening, DJ sets and some not-so-legit uses, which could have you running afoul of the Doobie Brothers, right Rerun?

1994
Iomega Zip Drive

Iomega Zip drives helped ease the transition from floppies to CD-RWs and affordable peripheral harddrives. They seemed capacious at the time; 100-700MB of storage was no joke.

1996
PALM PILOT
The Palm Pilot wasn't the first personal digital assistant, but it more clearly pointed toward our smartphone-filled future than other PDAs of the time — or, for that matter, the cellphones of the time. It wasn't the most capable, either, but it got the most right, with a simplified experience that remains usable (and a bit familiar) even today.

1996
TI-83 GRAPHING CALCULATOR
"In my high school math classes, I had a TI-83, and always felt like I was cheating somehow. This thing could do everything — including games and answering all of the most difficult math questions."
— *Brad Molen*

1999
Sega Dreamcast
The king of consoles in many people's eyes. It nailed controller design, online gaming and motion-based peripherals. Did we forget to mention the VMU? Oh, and free games?

1999
NOKIA 3210
After spending time with a pocket-filling Nokia 6160, the 3210 seemed like mobile freedom, with calling and text messaging at your fingertips, what more could you ask for?

1999
TiVo
We usually have to plan our days out meticulously in order to make it to work on time and accomplish daily tasks, but doing the same for leisurely sofa loafing? TiVo gave us freedom to kill time and watch our shows whenever we saw fit.

1999

Apple iBook Clamshell

With the launch of the iBook G3 (Clamshell), Apple rounded out its push for a unified and simplified line of devices. Along with its candy-coated accents, it was also among the first consumer laptops to support WiFi.

2001

iPod

Like so many other things in Apple land, the iPod wasn't the first of its kind. But in 2001, Cupertino gave the gadget world what it was searching for: an easy-to-use digital music player that just worked. A dozen years later, the player's 5GB cap seems laughable, but the potential for 1,000 songs in one's pocket was downright astonishing in 2001.

1999

ERICSSON MC218

A Psion 5mx with an infrared modem for your Ericsson T28 thrown in. Solid design, QWERTY keyboard, stylus-friendly screen and mobile data — hello, future.

1999

DIAMOND RIO 500

The second generation of the MP3 player brought with it increased memory (up to a whooping 64MB) and a USB port. According to *Wired*, you could push it to two whole hours of music playback, but in 1999, that was enough to keep us happy.

2001

LEATHERMAN MULTI-TOOLS

It doesn't have a touchscreen or a chipset, but we haven't come across a smartphone that can open a bottle of wine and trim your nose hairs.

2001
Fender Cyber-Twin

Loaded with motorized volume controls and impressive built-in presets that allowed it to "re-wire" itself to become any Fender amp of your dreams, the CyberTwin was a pleasing blend of nerd and rock.

2002
Sony Erisson T68i

"What? Sony *and* Ericsson working together to make a phone? A color screen, Bluetooth, support for a snap-on camera, triple-band GPRS, an email client, MMS and all that without the need for any demon worship. This handset will forever hold a special place in my heart." — *Sean Cooper*

2002
ROOMBA
The Jetsonian home of the future, today. Robots cleaning your home, providing free rides for your cat and leaving more time to relax in a slightly dirt-mitigated domicile.

2002
IMAC G4
While the G3 received the design plaudits, we have to commend the beautiful outrageousness of Jonathan Ive's sunflower-inspired PC with its floating arm display.

2002
Minimoog Voyager

Designed by Bob Moog himself, the Voyager took all that was the original Minimoog and updated it with 21st-century chops — right down to the ladder filters.

2003
AirPort Extreme

Six generations and multiple WiFi standards later, it still makes staying connected look good.

2003
CANON EOS DIGITAL REBEL (300D)

The Digital Rebel was the first Digital SLR to hit the market at under $1,000 including a lens. At $999, this 6.3-megapixel shooter was a relative bargain in 2003.

2004
MOTOROLA RAZR V3

The future had been calling us for years, but we finally had a way to answer it. The RAZR V3 was, seemingly, inspired by the *Star Trek* communicator and forged in the same furnace Skynet used for the T-1000.

2004
PALM TREO
Palm's Pre-cursor gave us a glimpse at the future of smartphones, bringing talk time to the PDA and eventually ushering in apps and a camera.

2005
XBOX 360
Microsoft's second game console brought online gaming to the forefront of living rooms, instantly transforming social gaming experiences from couch-only affairs to international events.
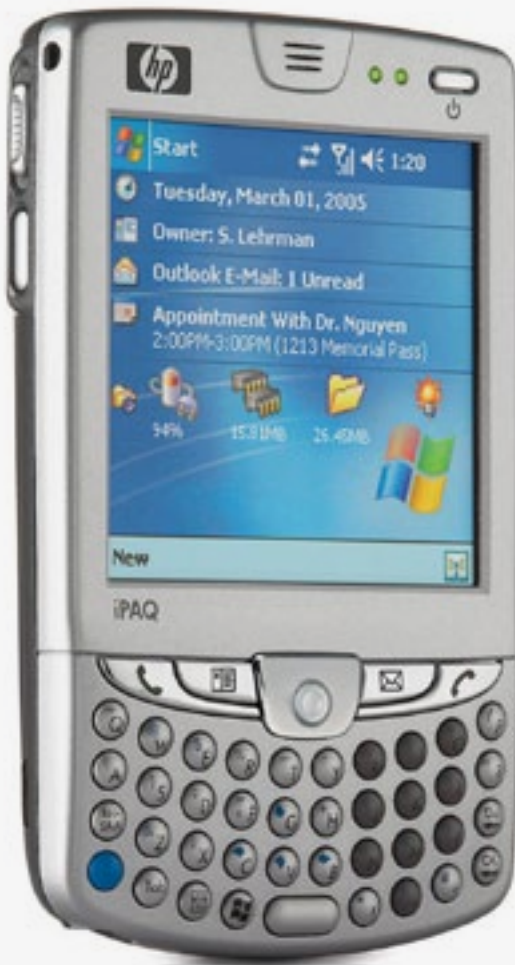
2005
HP IPAQ
"I was on AT&T, so it was my best option next to a Sidekick — and for checking Myspace during class over EDGE." — *Joe Pollicino*

2005
SONY ERICSSON K750i
Long before the Galaxy S4 Zoom and Lumia 1020, Sony Ericsson gave us the K750i. It was the first serious cameraphone, with a 2-megapixel sensor, AF lens and LED flash. It let us upload pictures to Flickr and inspired the photographer in all of us.

2005
BOSTON DYNAMICS BIGDOG
Perhaps no other headless horse-bot has captivated and frightened this team of nerds like BigDog, later graduating to the name AlphaDog.

2005
FM3 BUDDHA MACHINE
We're not entirely sure how this ambient-music maker works, but we're leaning toward magic. Whatever the case, who can say "no" to a pocket-sized Brian Eno?

2006
MACBOOK PRO
Say what you will about our our inclination towards the bitten fruit, but this machine remains one of Engadget's favored daily drivers.

2006
NINTENDO WII
Nintendo bowed out of the graphics race to offer a fundamental rethink of the way we play games and made gaming fun again in the process.

2007
iPhone
Apple didn't invent the smartphone so much as reinvent it with the iPhone, tapping into the company's penchant for beautiful design language and dead-simple interfaces. And with the App Store, Cupertino reinvented things yet again, making handsets a platform for a seemingly endless selection of software innovation.

2007
BLACKBERRY PEARL 8100

BlackBerry once had a heyday, and this was it. The Pearl was one of the best devices, thanks to its fabulous design, modern / youthful look and clever rollerball that became a staple of BlackBerry devices for the next few years.

2008
MACBOOK AIR

"I traded in my work-issued MBP for an Air and haven't looked back: the battery life is long enough to last me through of a day of press events, and my shoulders are grateful, too." — *Dana Wollman*

2008
NOKIA E71

One of the company's slimmest phones to date saw Nokia putting its muscle and design prowess behind a QWERTY handset, and we took notice.

2007
Pioneer Kuro

The Kuro ("black" in Japanese) met marketing expections and set a new standard in black levels for TVs — a key factor for videophiles — that remained unchallenged for years.
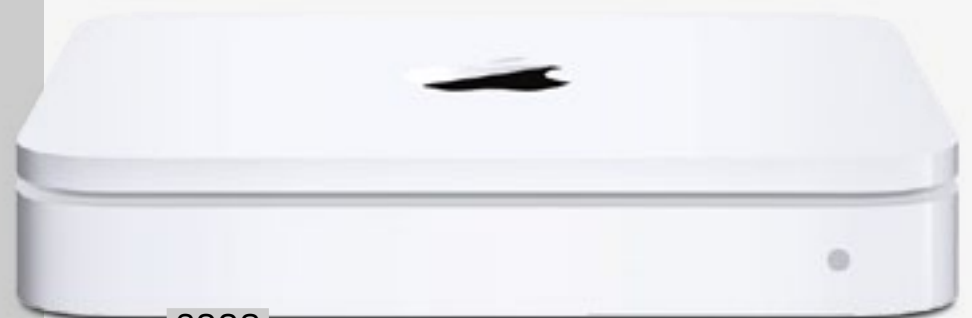
2008
Time Capsule

Let's face it, losing data sucks, and so does a proclivity towards procrastination in regards to backups. Luckily, setting up the Time Machine is a snap and the stress melts away as copies of your data are quietly coaxed through the air to a safer place.

2008

BlackBerry Bold 9000

BlackBerry has seen better days. One of them being the release of its Bold new device (aka the 9000). When we got our hands on the phone in 2008, we praised it as "one of the most elegantly designed devices we've ever had the pleasure of using."

2008

Dyson Vacuum

The Dyson design team could quite possibly be from the future, with their intelligent design and technological wizardry in merging cyclones and spheres.

2008

Bandai Gun O'Clock

It's one thing to hone your reflexes in the heat of battle, but testing them after being jarred awake by an infernal beeping noise is next-level stuff.

2009
HYPERMAC
We love our gadgets, and with HyperMac (now HyperJuice) battery packs, we can love them even longer (even if Apple doesn't always approve).

2009
Sonos Play:5
The dock-less speaker dock brought whole-home audio closer to the mass-es with a $400 price tag and impres-sive (though not pro-quality) sound.

2009
ETON MICROLINK FR160
Yes, it's an AM/FM radio, but with a solar panel and dynamo charging on board, a built-in flashlight and USB phone charger, it's like a Walkman on steroids.

2009
Motorola Droid
At the time of its release, we called the OG Droid "easily the best Android phone to date." With a slick design and revamped OS, the QWERTY slider re-established Motorola as a mobile leader.

2009
ELGATO TURBO.264 HD
You're not a true member of Team Engadget if you don't have your Elgato by your side at all times. If you're looking to get video up quickly, this handy little stick will get you through in a crunch.

2009
NIKON D3S

With a usable ISO range of up to 10,000, this camera changed the game in terms of low-light shooting and made our jobs at poorly lit press events that much easier.

2010
Jawbone Jambox

The Jawbone Jambox goes hand in hand with summer pool parties, and its stainless-steel design is outstanding to boot. Oh, and did we mention that the sound quality is pretty darn good?

2010
HTC NEXUS ONE

It was the first device of the Nexus dynasty and arguably the most polished. It set the standard for Android handsets and freed legions of users from the tyranny of carrier customizations. The HTC One Google Play edition is today's equivalent.
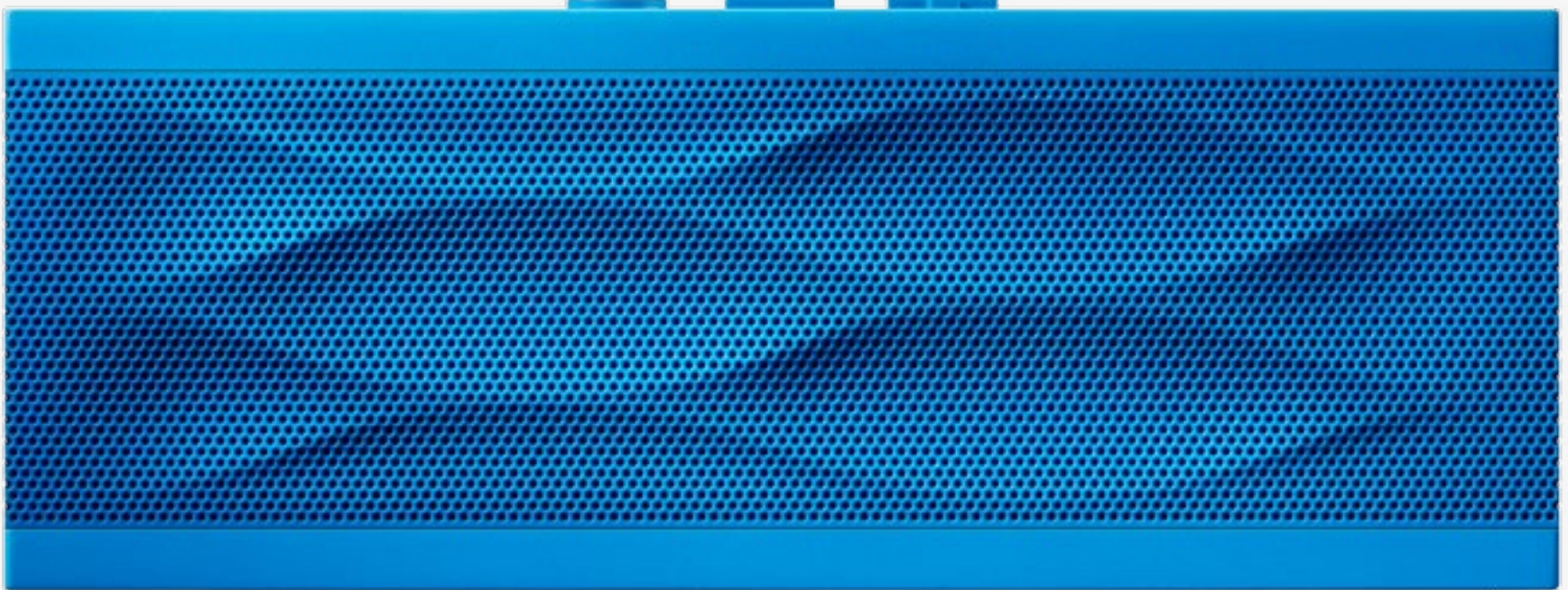
2010
SQUARE

It's not one of our daily drivers, but it's clear the diminuitive mobile payment system has had a big impact on small businesses.

GARMIN FORERUNNER 110 GPS

"Sure, I could go for a run without a watch on my wrist, but I don't want to. Being able to glance down at my wrist and see my pace, distance and time beats carrying a smartphone any day."
— *Dana Wollman*

2010

HTC DROID INCREDIBLE

HTC's OG Incredible immediately had us smitten back in 2010. So much so that some of us held on to it well beyond our upgrade windows.

2010

XBOX KINECT SENSOR

What began life as an answer to Nintendo's Wii has since become so much more. This favorite tool of hardware hackers everywhere has been used for everything from 3D scanning to giving vision to robots.

2010

iPAD

Aldous Huxley proposed doors of perception, but Steve Jobs gave us windows to the world. The original iPad managed to successfully jump-start the age of the tablet, where many others had failed.

2010

V-Moda Crossfade LP Headphones

V-Moda talks a good game about bespoke ideals and high-quality sound, and it's no lie. These headphones have a sturdy, stylish metal build and the sound quality is top-notch.

2011

Sony NEX-C3

Yet another trusty gadget that rarely leaves Engadget editors' sides, this mirrorless camera is compact, easy to use and snaps some downright gorgeous pics.

2011

MY KEEPON

Researchers created this little yellow marshmallow of a robot to help children with developmental disorders, but we'll be frank: we love it for its smooth dance moves.

2011

CURIOSITY ROVER

Hey, it's no R2-D2, but of all the real-world robot explorers to land on Mars, Curiosity Rover seems to have the most personality. Of course, NASA has worked tirelessly to humanize this robo-explorer, but we have to say, the selfies really do help.

2011

RED SCARLET-X 4K

Simply put, this camera is a video-nerd's dream come true, but at nearly $10K, it's not exactly aimed at hobbyists.

2011

NOKIA N9

Nokia's first phone to truly compete with iOS and Android died alongside MeeGo when the company chose to focus on Windows Phone. Its legacy lives on with the Lumia's industrial design and Asha's new touch UI. Truly one of the last unicorns.

NASA/JPL-CALTECH/MSSS (ROVER)

2011
NOOK SIMPLE TOUCH
The push toward hardware simplicity has overlooked one key element: the human hand. With the Nook Simple Touch, Barnes & Noble created an e-reader that we never want to put down.

2012
SONY RX100
Sony reinvented the point-and-shoot with its pricey, yet pocketable RX100. The camera's 1-inch sensor enables excellent performance, even in low light.

2012
SAMSUNG GALAXY NOTE II
Samsung basically invented the phablet and with the Note II, it nearly perfected it. A brilliant, spacious display and the famous S Pen make for one of the most memorable handsets in the last several years.

2011
SAMSUNG GALAXY S II
It takes a lot to win us over on mobile, but Samsung's Galaxy S-uccessor did just that, inspiring us to write: "... it might well be the best smartphone, period."

2012
TESLA MODEL S
Electric cars have been around since before the Model T was born, but with Elon Musk behind it, Tesla Motors finally managed to break into the auto industry with its Model S electric, and it continues the push towards a greener commute for all.

2012
Raspberry Pi

This pint-sized PC has delivered on affordability and scale, enabling the DIY masses to tinker to their hearts' content.

2012
Amazon Kindle Paperwhite

Barnes & Noble beat Amazon to the front-lit punch, but the latest Kindle did it right, bringing bedtime reading to an already great device.
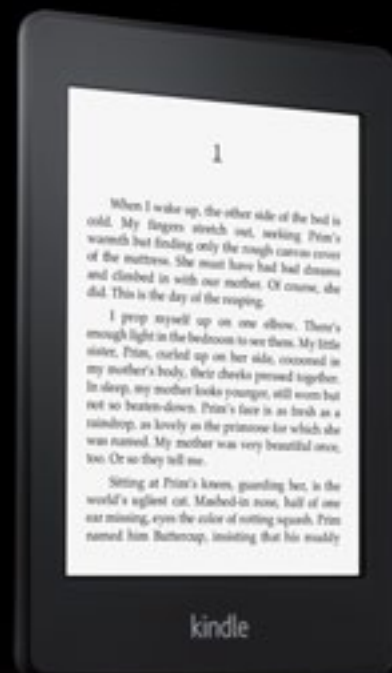
2012
PARROT ZIK HEADPHONES
From legendary designer Philipe Starck, these wireless headphones offer quality sound, capacitive touch controls and a supremely comfortable fit with memory foam earpads wrapped in supple leather.

2012
HTC ONE X
Buying an HTC One X was a lot like getting a unicorn: it was wild, fast, white, beautiful, expensive and fickle.

2012

PARROT AR.DRONE 2.0

Drones have been getting a bad rap lately. But as for the one's that can deliver sushi to our table and pizza to our doorstep, we've got nothing but love.
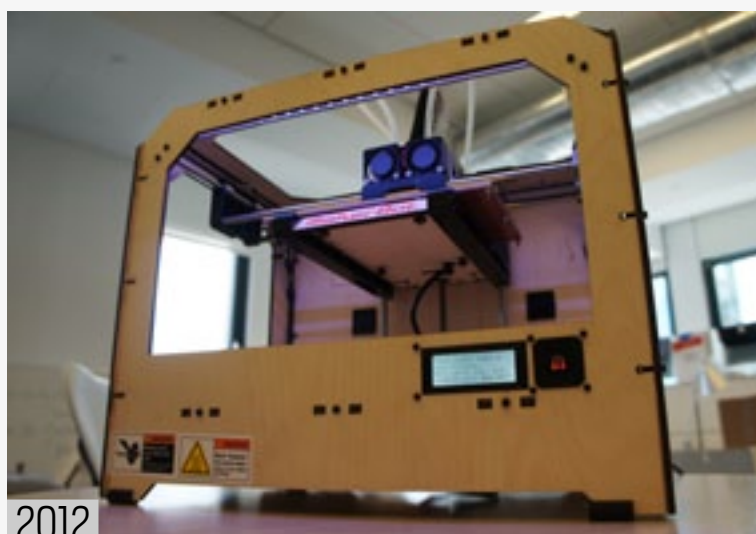
2012

MakerBot Replicator

Spearheading the maker revolution, Bre Pettis and MakerBot helped put manufacturing into the hands of the masses, with the relatively afford-able Replicator.

2012

LIVESCRIBE 2GB SMARTPEN

"I don't tell rival journalists about my audio-recording, note-preserving Smartpen, because I want their lives to be as difficult as possible. Does that make me a meanie?" —*Sharif Sakr*
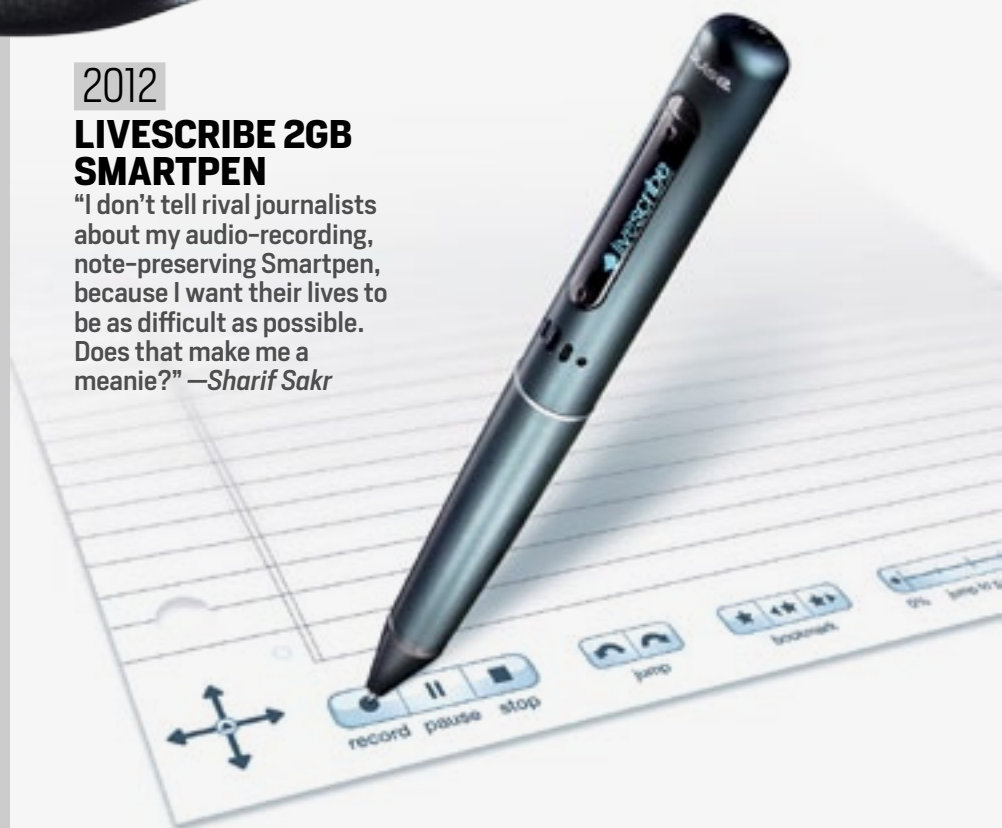
2013

HTC One

HTC's latest flagship is the company's best effort to date. Its beautiful design, great display and solid performance have convinced us that the One is among the finest phones you can buy.

2013
Pebble Smartwatch

Not only did this wearable break Kickstarter records, but it also resurrected the smartwatch in the eyes of many. With its notification feature, smartphones can stay stowed, as message previews are just a wrist-glance away.

2013
Roku 3

The Roku 3 keeps everything that's made the brand successful and ushers in some welcome improvements, all without boosting the price or ruining the simple setup.

2013
NOKIA LUMIA 1020

Nokia packed 41 megapixels into its customary slick, unibody design. The company thinks imaging is the future battlefront for the smartphone wars, and this handset's got the artillery to back it up.

2013
ASUS PADFONE INFINITY

ASUS' handsome shape-shifter proves that sometimes one device just isn't enough.

SONY CX-430V
The 430V's Balanced Optical SteadyShot enables smooth captures without a tripod. It's like having a Steadicam built into the camera.

LG OPTIMUS G PRO
With a beautiful display, super-fast processor and other top-of-the-line features, the Optimus G Pro is a rock-solid Note II competitor, sans the stylus.

Oculus Rift

Our early experiences with the headset had us longing for more, and with a fresh round of funding in the bank, we're hoping our VR fantasies become a reality soon.

If you can connect to this.
You can connect to us.

Reach State Farm® 24/7/365
by phone, online or app.

Learn More ▶

🔴 State Farm®

ESQ

...LIZED

DISTRO
07.26.13

See it in
action!

GARY PHUNG / FLICKR: THEGARYPHUNG

COMIC-CON ROBOT

LIZED

Comic-Con draws tens of thousands of enthusiasts each year to celebrate the multi-faceted world of comics, movies and more. Many take the opportunity to pay homage to their favorite characters through a little cosplay. This year was graced by a special addition from collaborative minds at *Wired*, Stan Winston Studio and Legacy Effects to name a few. This 9-foot-tall robot suit sported four weaponry-laden arms and was mobile enough to stalk through the event, welcoming attendees, showing off its "guns" and stirring up at least one pop-and-lock, robot dance battle.

GARY PHUNG / FLICKR: THEGARYPHUNG

See it in action!

LUKE WOOD

The PRESIDENT AND COO OF BEATS on the dynamic mobile space and discovering your real–life soundtrack

What gadget do you depend on most?
It's a tie between HP Spectre, MacBook Pro, BlackBerry 9900 (OG), HTC One with Beats Audio and iPhone 5. Since different devices work for different applications and circumstances, it's important to be fluent on many platforms to see where the opportunity is — even if that means going through airport security looks a bit like a *Monty Python* skit.

Which do you look back upon most fondly?
The RIM Inter@ctive Pager (850) fundamentally shifted how I interacted with the world. The BES server was fast and stable and suddenly email went from a desktop-dedicated work tool to a means of intimate, real-time communication.

Which company does the most to push the industry?
In mobility, I don't think you can say there is just one. This is an extremely dynamic space and every day true innovation comes from both incumbent operating systems and OEMs, and the aspirant, dis-

ruptive challengers. From a global perspective, we should see this space evolve every 18 months for a long time to come.

What is your operating system of choice?

OS X, iOS and Android are tied for mobility. I have just started really spending time with Windows 8, but so far it's fun and very clean.

What are your favorite gadget names?

There's something serenely domestic and reassuring about Nest. The name invites you into a digital and organic discourse that perfectly fits the product experience and immediately makes you feel like you've just dropped coal into a potbellied stove. We have a portable Bluetooth speaker called the Pill that I love as well — it looks like a pill,

is the perfect antidote to bad portable sound and was prescribed by the doctor... Dr. Dre.

What are your least favorite?

Pretty much anything that combines a character from the original *Battlestar Galactica* with a number usually in the thousands — the Adama 7700, Omega 1011A, etc. Names that combine two random Latin roots to make it sound innovative also confuse me. Made-up words can be really interesting, but they need to have an emotional connection to the product.

Which app do you depend on most?

If an email client counts as an app, then definitely email — somewhat regressive, but still unbelievably efficient to manage workflow and a global business. No. 2 for me is iTunes. I can't imagine life without music and iTunes is still my player of choice. For streaming music, Beats is currently developing a service that has the opportunity to significantly shift consumers' expectation of what a streaming music service does.

What traits do you most deplore in a smartphone?

An inelegant UI that leaves you stranded in screens with invented icons and no exit. It's like a movie mash-up of the final hedge

maze scene in *The Shining* meets *Groundhog Day*.

Which do you most admire?
The basics are still speed, stability, quality of voice telephony and battery life. An operating system and device that [do] not allow me to find a contact and dial, text or email with maximum speed and efficiency fails before I've bothered to notice the quality of display or how many megapixels the camera has.

"I'm as excited as any consumer of media about the evolution of graphics processors, display technology and ultra-high-resolution video formats but this has come at the cost of sound quality ... you are not getting the emotion of the content if you don't focus on both experiences."

What is your idea of the perfect device?
Something that teaches me new behavior and solves problems I did not know I had. The iPad is a perfect example. Even though I already had an iPod and iPhone, within three weeks I was addicted and now use all three for different things. I also appreciate a device that is beautiful for its pure aesthetic principles and quality of design. A simple, elegant machine is a sexy thing.

What is your earliest gadget memory?
They have all been repressed! If I had to dig deep, it's probably the first Sony Walkman that was a gift from my parents in 1981. I was 12 years old and the device instantly became part of my DNA. It was on me everywhere, hanging from my body like a FedEx package tracker. It freed my music from the solitary confines of my bedroom and allowed my life to have a real-time soundtrack.

What technological advancement do you most admire?
Hands down the stereo. If I were to look at my life and think what technology has brought the most meaning, impact and joy to me, it would have to be stereophonic re-

cordings. I'm obsessed with counterpoint and how the push / pull of a rhythmic section plays with left / right phrasing — this would not be possible in a mono world. No. 2 is the wheel. No. 3, WiFi.

Which do you most despise?
The almost fetishistic obsession with product ID and display technology at the cost of sound reproduction. I'm as excited as any consumer of media about the evolution of graphics processors, display technology and ultra-high-resolution video formats, but this has come at the cost of sound quality. Media is most often a combination of sight and sound and you are not getting the emotion of the content if you don't focus on both experiences. Video and audio are a binary choice, but the investment always flows into video, often abandoning audio to become a subpar experience. Now that we have this incredible video resolution and beautiful, paper-thin ID, let's deliver the rest of the experience.

What fault are you most tolerant of in a gadget?
Battery life. I have been trained the hard way to obsessively charge everything all the time so that any

given space looks like a recording studio patch bay. Maybe it's hangover from playing so many video games in the 1980's where the deteriorating life bar was just part of the game.

Which are you most intolerant of?
Software crashes — completely inexcusable to me as a consumer. It feels like the ultimate betrayal.

When has your smartphone been of the most help?
I'm currently having a newfound romance with my smartphone. My kids are constantly on theirs and with my busy travel schedule, my smartphone gets me as close to "there" as possible, even when I'm on the other side of the world. I'm actually writing this from China while my kids are in Los Angeles, and in the process, I have Instagrammed with them, traded links on SoundCloud, seen every possible emoticon to describe the attributes of our dogs and been the recipient of multiple 10-second films shot with the 8mm app. In short, genuine, spontaneous human interaction even when geographically dislocated and 100 percent enabled by the technology in this device.

> "It's just easier and more reliable to text / email than it is to place a voice call, both from the way the UI is designed to the quality of the networks."

What device do you covet most?
Probably my vintage Korg SDD3000 digital delay. My background is the music industry and recording studios and I bought this device in hopes of sounding like The Edge from U2. I never came close, but the sound is completely unique and it's one of the few pieces of digital tech in my life that has not been replaced by software running off of a PC or smartphone. Plus, the look of it screams "Axel F" by Harold Faltermeyer, which is incredible for something so functional.

If you could change one thing about your phone what would it be?
I would like to see the perfect hybrid of telephony and the smartphone. I think if people actually spoke to each other more often rather than text, there would be a much clearer understanding of intent, alignment, motivation and desire. It's just easier and more reliable to text / email than it is to place a voice call, both from the way the UI is designed to [the] quality of the networks. This is heavy lifting, but a call should be effortless without sacrificing industrial design and all the wonderful things our device can do.

What does being connected mean to you?
I am always connected so it means every day, steady state. If I have IP, I am all in.

When are you least likely to reply to an email?
When I am sleeping, on an international flight or in Wellfleet, Mass. — due to coverage — not that I've ever noticed, or wondered why 45 percent of the world's population is now covered by a 3G mobile network, but not Wellfleet, Mass. I think there might be a Jonathan Richman song in this.

When did you last disconnect?
Oh my... 1997. Occasionally, I'm in extended IP exile (anything over 15 minutes) and I feel a slow, pulsing panic spread over me like a rash at summer camp. Ⓓ

OPTRIX XD5 WATERPROOF IPHONE CASE
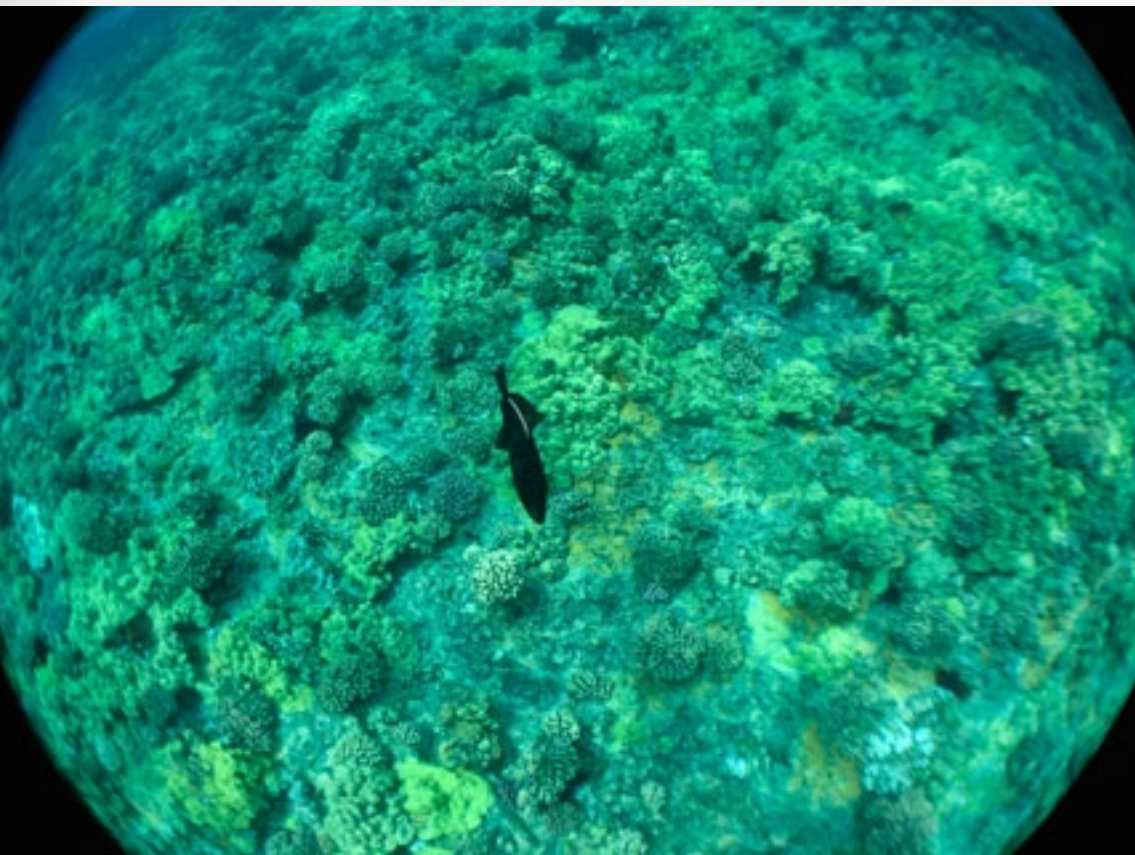

Rokform RokDock Charging Stand

A FEW MONTHS BACK, I took Mophie's Outride for a spin in the Montana wilderness. Despite being a decent package, I found too many flaws to actually recommend it without reservations. A few weeks ago, I was able to test out a formidable rival, the $130 Optrix XD5. In a nutshell, it's a waterproof case for your iPhone 5, and there's an $80 model available for those still rocking an iPhone 4 or 4S. After splishsplashing around with this thing in the waters surrounding Maui, I'm confident I've found a winner.

The standout feature here is the intelligent design. Unlike the Outride, this case actually allows you to use your phone while it's encased. Yeah, you'll need to mash a little harder on the screen, but still, it works. That's something that precious few rugged / waterproof cases can say. There's also access to the home button, the power button and the volume buttons — even while it's entrapped in a watertight chassis. It's also shockingly thin, adding next to no bulk for the protection it offers. The rear of it adds a wide-angle extension, enabling you to capture far vaster scenes when snapping stills or recording video.

As you can see in my sample shot, it also adds distortion on the edges, but it's nothing a little cropping can't fix. Beyond that, the quality isn't degraded — my mum was actually astonished at the clarity of the video I managed to grab while snorkeling at Molokini crater. It's pricey for a case, but not for an underwater case. If you're planning any summer jaunts near the water, this one's worth investing in.

— *Darren Murph*

ROKFORM ROKDOCK CHARGING STAND
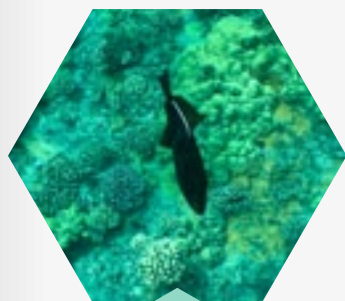
Optrix XD5 Waterproof iPhone Case

AS A PRACTICAL DUDE, I typically prefer my gadgets to come with extra utility. Sometimes, though, my guy genes tend to override my penchant for common sense. It's the same reason why I have a hard time answering questions from lady friends such as "Why do you have an 83-inch TV?" or "Why are you guys so obsessed with hair loss?" Um, just 'cause?

This is the same conundrum I'm faced with when trying to objectively assess Rokform's RokDock, which is available for the iPhone 5 and Samsung's Galaxy phones. On the one hand, I usually want my charging docks to be multi-taskers, and the RokDock fails horribly at that. It doesn't have a speaker, radio or even a clock. Nope, this sucker does one thing and one thing only: charge your phone. Well, that and press the right buttons on the hot-blooded guy meter. Did I mention, for example, that it's made from CNC-machined, aircraft-grade aluminum? That remark actually earned an "ohh-kay" from a female co-worker and likely an eye roll from all my ex-girlfriends. It also weighs a honkin' three pounds and looks like something that came out of *Transformers*. Lastly, it requires some assembly to install the included charging cable, playing on some folks' desire to tinker with their gadgets. The result is a solidly built charging dock that won't topple over easily and can also accommodate phones with a case, depending on how you adjust the positioning of the charging tip during assembly.

Despite my guy genes clouding my judgment, however, I'm not blind to the RokDock's shortcomings. One involves its lack of an actual plug for connecting the dock to a wall outlet. Instead, you get a USB connector, so you'll need to connect it either to a computer or a wall adapter if you want to use it. Another is its $99 price tag, which is pretty high considering it's essentially a glorified charging cable in a metal housing. As such, this one-tasker won't be for everyone, including some dudes. However, if you're the type of guy — or girl — who'd blurt out "you had me at 'aircraft-grade aluminum,'" then feel free to give it a look.

— *Jason Hidalgo*

100 Years Forward in Technological Evolution

SAM HENDERSON, BOX BROWN, SHANNON WHEELER

WHAT IS THIS?
TOUCH TO FIND OUT

Back in the '60s, the Army and Navy tasked General Electric's R&D center to develop a machine to augment human lifting ability. The team planned to deploy the HARDIMAN in remote areas where forklifts and other large-scale equipment would be impractical. As a step towards a full-body exoskeleton, they created this fixed-arm and hand assembly to test load capability, managing 750 pounds. The completed prototype would be worn by an operator, with arm and leg movements transferred to the robotic appendages, giving it a total lift capacity of 1,500 pounds. That should be enough power for some clandestine cyber-stevedore work or dispatching troublesome *Aliens*.

GE
HARDIMAN
1

DISTRO
engadget